28

COTTON

Volume 84
Number Nine
$1.10 a Year.

JULY, 1920

Published monthly by
Publishing Co.,
Dallas and Atlanta, Ga.

Rubber Goods for the Textile Industry

The textile trade salesmen and practical factory men of the United States Rubber Company are qualified through study and experience to recommend the right mechanical rubber goods for any condition which exists in this industry, thereby assuring the greatest possible service for every dollar invested.

Take advantage of this Company's facilities and experience when in the market for mechanical rubber goods. Through our nearest Branch you can obtain the fullest co-operation of our organization.

United States Rubber Company

The World's Largest and Most Experienced Manufacturer of Mechanical Rubber Goods

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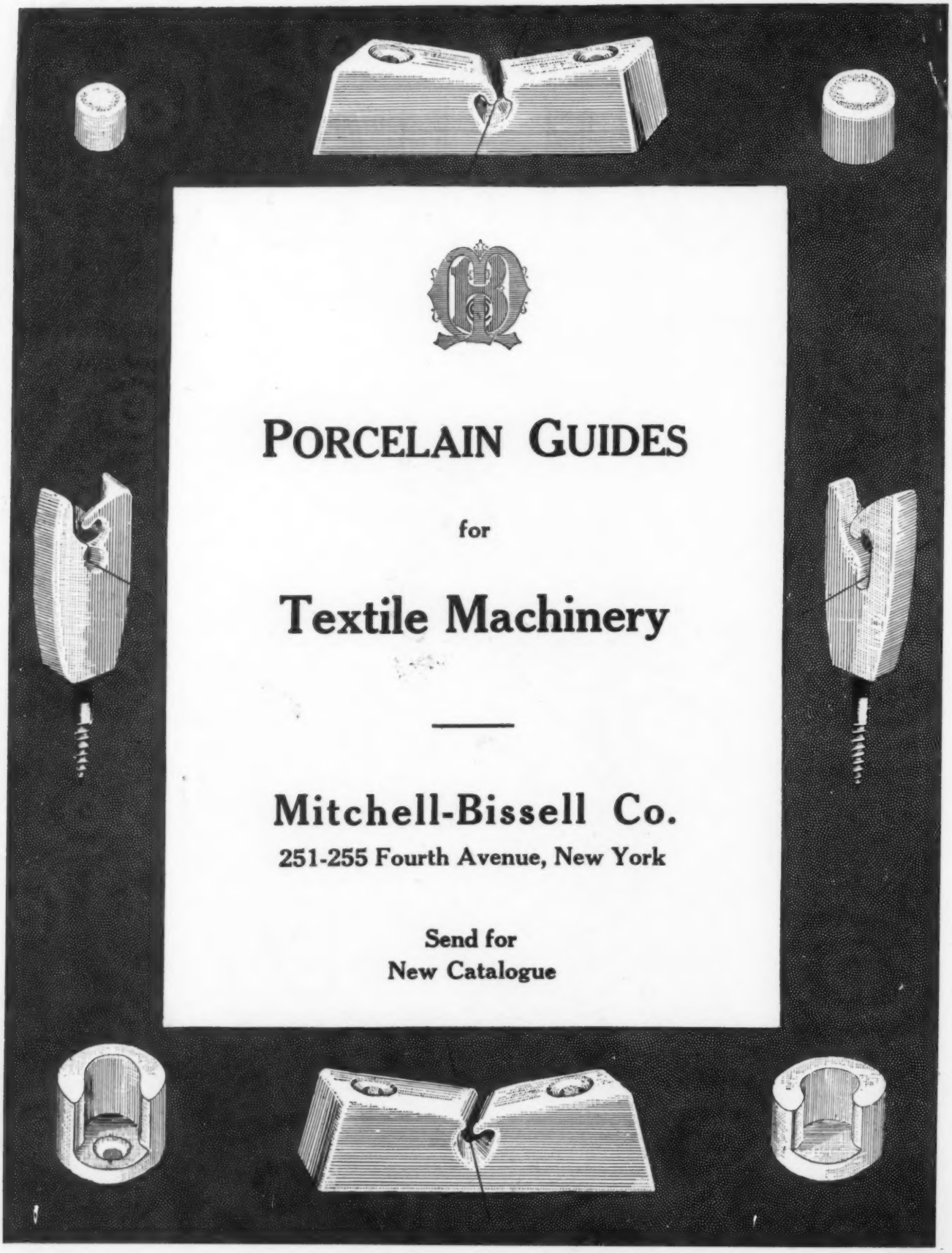


Entered as second-class matter at the postoffice, Dalton, Ga., under Act of March 3, 1879.

NORTHROP

TRADE-MARK

LOOM REPAIRS

OUR loom repairs are made from the same patterns as the parts that they replace on the Northrop looms; they are machined with the same tools, jigs and fixtures; they are made from the same high grade materials

Repairs made under our conditions **ARE** better than those made in job foundries and shops and without our interest in the working of the Northrop loom

Draper Corporation service goes with our goods

Our prices for loom and other repairs are low

We carry several hundred tons of Finished Loom repairs in stock for the convenience of our customers

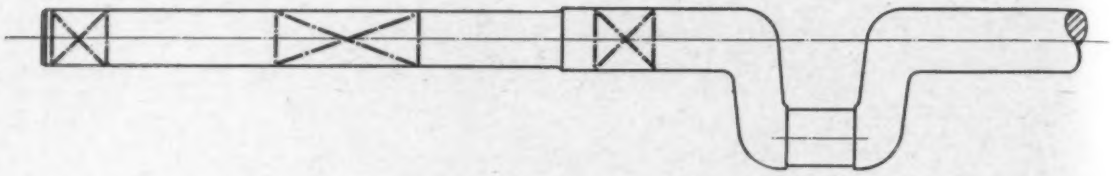
DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

Southern Office
188 South Forsyth Street Atlanta Georgia

Copyright 1917 by Draper Corporation

THE OLD CROSSED LINES



Here's a drawing of an old-fashioned loom. If the bearings are represented by diagonal lines then ordinary bearings are being used and no thought has been given to the uncertainty of operation, to the many shut-downs for repairs, to the frequent oiling which will be needed.

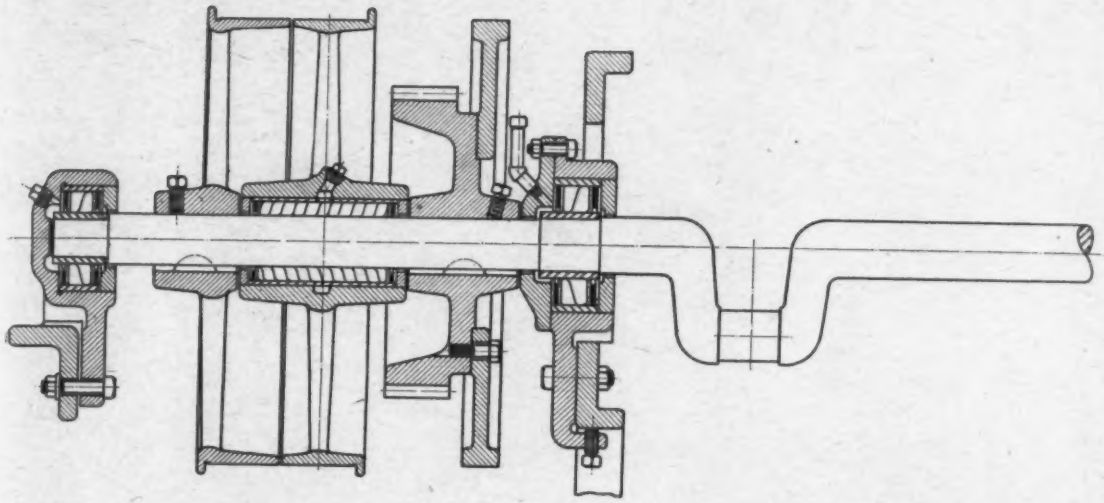
Bearings are not just details of looms---they are very vital parts and careful consideration should be given to them.

Progressive mill owners who know the advantages of Hyatt-equipped looms are discarding their power-wasting plain bearings and are installing power-saving Hyatt Roller Bearings.

Don't continue to order plain bearing looms just because the old designs show them---specify Hyatt Roller Bearings.

HYATT ROLLER BEARINGS

VERSUS MODERN BEARINGS



This drawing shows a Hyatt equipped loom---a modern loom. If a design shows Hyatt Roller Bearings, sound judgment has been used because these modern bearings eliminate the uncertainty of operation, prevent shut-downs for repairs, and make frequent oiling unnecessary. The loom shown here is designed according to the latest engineering principles and Hyatt Roller Bearings are a logical part of good loom design because they increase production---(a recent test showed an increase of approximately 26%)

Instead of the conventional lines indicating plain bearings, see to it that the proper type of Hyatt Roller Bearing is specified.

Write to the Hyatt Roller Bearing Company, New York, N. Y., for complete data on these modern bearings for textile machinery.

1963

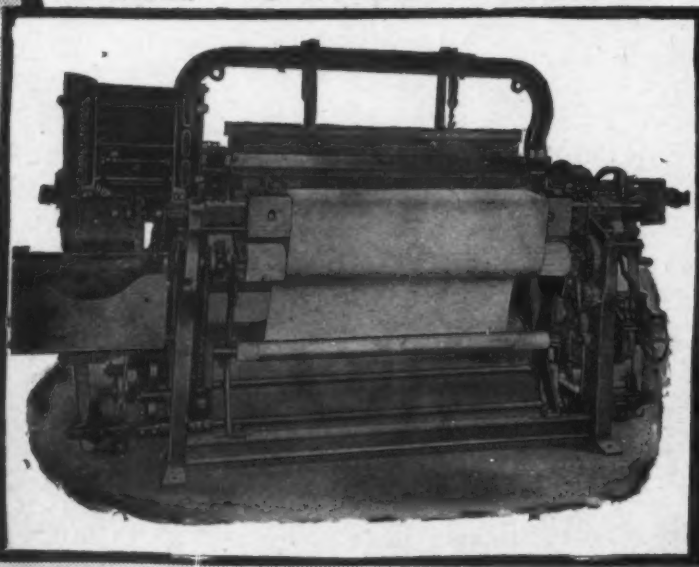
FOR TEXTILE MACHINERY

Dependable Looms

STAFFORD DUCK LOOM

The Stafford Company for a great many years has concentrated on the production of a strictly practical loom. Convincing proof of the soundness of this idea is found in the large list of repeat orders for Stafford looms from a steadily growing list of progressive mills both in this country and Canada.

THE STAFFORD COMPANY



Readville
Mass.

Southern Agent
J. H. MAYES
Charlotte
N. C.

Tallow vs. Cocoanut Oil

Nobody ever succeeded in proving that tallow had a superior as a softener of cotton for certain types of work. Tallow has physical properties that are responsible for its popularity. Properly selected and prepared it is used with good results. The difficulty comes in the selection to obtain uniform tallows and in preparation to secure maximum efficiency.

Cocoanut Oil is bought on the market in tank car lots and runs very nearly uniform. For some kinds of work Cocoanut Oil is much to be preferred because of its excellent powers to penetrate and soften. Cocoanut Oil will penetrate where tallow will serve as a surface dressing. The kind of work in process determines which should give best results.

Concentrated TALLOW Emulsion

With characteristic Moore Oil exactness we have overcome the disadvantages of lack of uniformity in tallow by bringing all tallow purchased on specifications to a fixed standard in our storage and from this uniform tallow we manufacture a concentrated tallow emulsion that is without equal as a softener. This softener has the advantage of uniformity obtainable with cocoanut oil combined with the desirable physical properties of the tallow.

We are always glad to take an interest in selecting a suitable softener from our line, which includes Cocoanut Oil Softeners, Tallow Softeners, Olive Cream Softeners, Grease Softeners —all of highest degree of purity, concentration and dependability.

Textile Oil Department.

The Moore Oil Refining Company

Cincinnati, Ohio

The MOORE OIL REFINING CO. CINCINNATI, O.

READY TO SERVE YOU

These Machinery and Factory Supply Companies throughout the country carry complete stocks of Hyatt Roller Bearing Hangers and are prepared to give you the best of service. Select the company nearest you and ask them to quote on these power and lubricant saving, durable roller bearing hangers—Hyatt.

Alabama,	Birmingham—The Fairbanks Company
Arkansas,	Little Rock—Hollis & Company
British Columbia,	Vancouver—Canadian Fairbanks-Morse Company
California,	Los Angeles—Harron, Rickard & McCone
	San Francisco—Harron, Rickard & McCone
Connecticut,	Bridgeport—The Fairbanks Company
	—Lindquist-Boerum Company
	Hartford—L. L. Ensworth & Son
Georgia,	Atlanta—Cotton States Belting & Supply Company
Illinois,	Chicago—R. R. Street & Company
Indiana,	Evansville—Evansville Supply Company
	Indianapolis—Vonnegut Machinery Company
Kentucky,	Louisville—E. D. Morton & Company
Louisiana,	New Orleans—The Fairbanks Company
Maryland,	Baltimore—The Fairbanks Company
Massachusetts,	Boston—The Fairbanks Company
	—Lewis E. Tracy Company
	Pittsfield—Berkshire Mill Supply Company
	Springfield—W. J. Foss Company
Michigan,	Detroit—Palmer-Bee Company
Minnesota,	Minneapolis—Northern Machinery Company
Missouri,	Kansas City—English Tool & Supply Company
	St. Louis—Colcord Wright Machinery Company
New Brunswick,	St. John—Canadian Fairbanks-Morse Company
	—A. R. Williams Machinery Company
New Jersey,	Newark—Lincoln Products Corporation
	Paterson—N. W. Mills Company
	Trenton—Manufacturers Selling Company
New York,	Binghamton—Charles Millar & Son Company
	Buffalo—Peerless Mill Supply Company
	Elmira—Horton Machine Works
	New York City—A. P. Dienst
	—The Fairbanks Company
	—Patterson, Gottfried & Hunter, Inc.
	Poughkeepsie—Tiffany Diamond Garage Machine Shop
	Rochester—Haverstick & Company

HYATT BEARINGS

READY TO SERVE YOU

New York,	Syracuse—Syracuse Supply Company
	Troy—Troy Belting & Supply Company
	Utica—Charles Millar & Son Company
	—Smyth-Despard Company
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	Cincinnati—Wirthlin-Mann Company
	Cleveland—Strong, Carlisle & Hammond Company
	Columbus—The Bacon Company
	Dayton—M. D. Larkin Supply Company
	Toledo—Coghlin-Kirkby Machinery Company
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	Ottawa—Canadian Fairbanks-Morse Company
	Toronto—Canadian Fairbanks-Morse Company
	—H. W. Petrie, Ltd.
	—A. R. Williams Machinery Company
	Windsor—Canadian Fairbanks-Morse Company
	—J. T. Wing Company
Oregon,	Portland—Link Belt Company
Pennsylvania,	Easton—Macan Jr. Company
	Erie—H. P. Weller Supply Company
	Philadelphia—The Fairbanks Company
	Pittsburgh—Pittsburgh Gage & Supply Company
	—Tranter Manufacturing Company
	Reading—Bright & Company
	Scranton—The Fairbanks Company
	Williamsport—Valley Iron Works
Quebec,	Montreal—Canadian Fairbanks-Morse Company
	—A. R. Williams Machinery Company
	—Williams & Wilson, Ltd.
	Quebec—Canadian Fairbanks-Morse Company
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	—New England Sales Company
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Utah,	Salt Lake City—Engineering Sales Company
Virginia,	Richmond—James McGraw, Inc.
Washington,	Seattle—Brinkley Supply Company
Wisconsin,	Milwaukee—C. A. Biebler

MOTOR BEARINGS DIVISION
DETROIT, MICHIGAN

HYATT ROLLER BEARING COMPANY
INDUSTRIAL BEARINGS DIVISION
NEW YORK, N. Y.

TRACTOR BEARINGS DIVISION
CHICAGO, ILLINOIS

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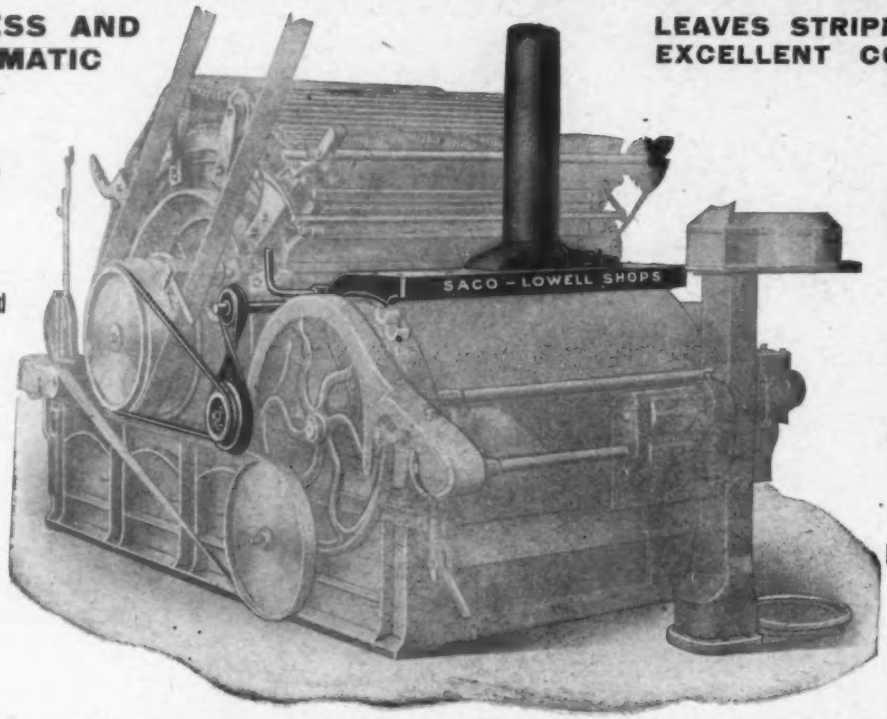
FOR LINE SHAFTS

SACO-LOWELL CARD STRIPPER

DUSTLESS AND AUTOMATIC

LEAVES STRIPPINGS IN EXCELLENT CONDITION



Economical to Operate

Saves Time and Labor

Strips Card Clean

Sanitary and Efficient

Low Cost of Maintenance

Simple, Durable Practical

Control Always Absolute

Full Information Furnished

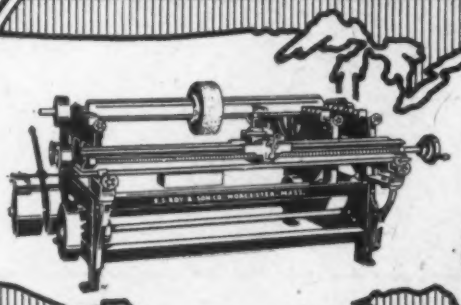
Rogers W. Davis, Southern Agent CHARLOTTE, N. C.

Saco-Lowell Shops, Newton Upper Falls, Mass.

Southern Branch Office GREENVILLE, S. C.

B. S. ROY & SON CO. EST. 1868

MADE IN AMERICA



SHIPPED THE WORLD OVER

TEXTILE GRINDING MACHINERY WORCESTER, MASS. U.S.A.

For More Than 50 Years

—we have concentrated on the building of Roy Grinding Machines for textile mills exclusively, and have striven with each passing year for added efficiency, capacity and durability.

Naturally, if better machines could be devised, we would build them.

The Roy line includes Grinders for cotton and woolen cards, nappers, garnets, shears and calender rolls.

Descriptive bulletins will be mailed on request.

B. S. ROY & SON CO.

Established 1868
WORCESTER, MASS.

E. M. TERRYBERRY, Southern Agent,
c/o Howard Bros. Mfg. Co.,
1126 Healey Bldg., Atlanta, Ga.

John Sidebotham & Sons Company

MANUFACTURERS OF TAPE

PHILADELPHIA, PENNA.

Using a Large Number of Individually Driven Looms

Like the many others who have installed Westinghouse Individual Loom Motor Drive, the Jonn Sidebotham & Sons Co. has achieved these results:

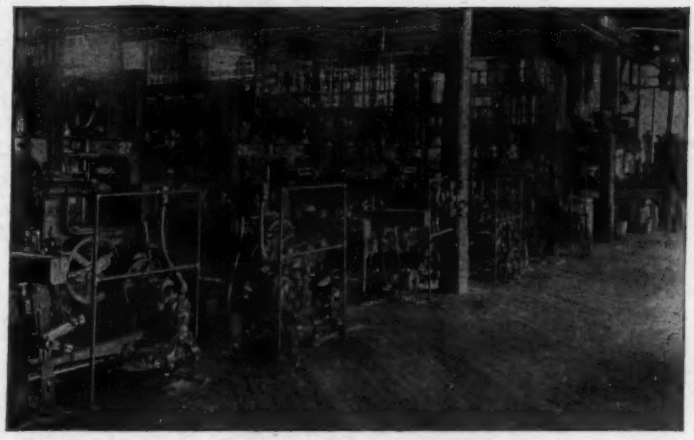
1. A product of better quality.
2. A reduction in power expense.
3. Increased output.

The satisfaction experienced with Westinghouse Individual Loom Drive is clearly indicated by the frequent repeat orders that have come from this and other customers.

The broad experience of Westinghouse Textile Power Experts is always available in the solution of your power problems.

WESTINGHOUSE ELECTRIC & MANUFACTURING CO.

East Pittsburgh, Pa.



Westinghouse

The Place of HUMIDITY IN COTTON MANUFACTURING

No. 1 Opening and Preliminary Operations

The first operation is opening to loosen fibres, preliminary to the successive stages of picking in the Breaker, Intermediate and Finisher Lapper. The cotton is cleaned of its larger pieces of leaf, motes, seeds and dirt, and issues from the Finisher Lapper with a definite weight ready for the card.

In the opening room, the temperature should be adapted to good working conditions. When using white raw stock, no humidity is advisable. In using dyed raw stock, some humidity may be advantageous to compensate for the extreme drying out that the fibre has undergone.

The moisture content will probably have fallen to 4 1-2 per cent Regain in these preliminary operations, due to the fanning of the swift-moving beaters.

Profit by "High Duty Climate"

Parks-Cramer Company

Engineers & Contractors

Industrial Piping and Air Conditioning

Fitchburg Boston Charlotte

The Fourth Southern Textile Exposition will be held in Textile Hall, Greenville, South Carolina, October 18th to 23rd inclusive.

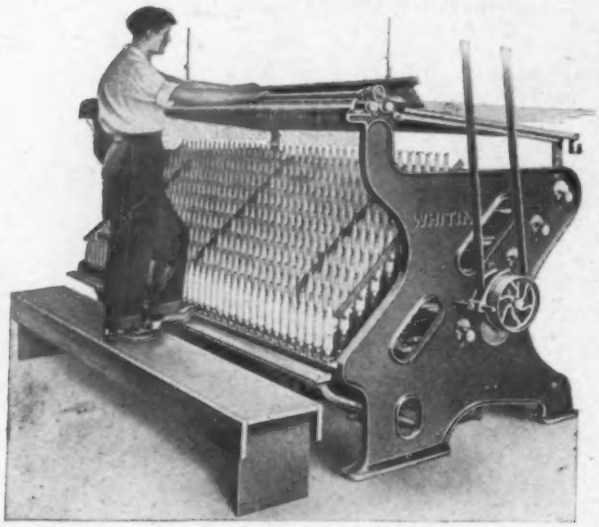
All interested in textile industries are invited to attend.

Southern Textile Exposition, Inc.
Greenville, South Carolina

WHITIN MACHINE WORKS

ESTABLISHED 1831

TEXTILE MACHINERY



Manufacturers of

LONG-CHAIN QUILTING MACHINES

for

Colored, Bleached and Mercerized Yarns

The Use of This Machine Insures:
First Quality in Production,
Increased Profits,
Reduced Labor Costs,
Savings in Power Consumption,
Economy in Floor Space.

Full particulars on request.

MAIN OFFICE AND WORKS

WHITINSVILLE, MASS., U.S.A.

SOUTHERN OFFICE CHARLOTTE N. C.

THE SIMPLEST AND THE MOST ELABORATE

FABRICS

Are produced on

LOOMS

From the

Crompton & Knowles Loom Works

WORCESTER, MASS.

Providence, R. I. Paterson, N. J. Philadelphia, Pa.

Alexander & Garsed, Southern Representative, Charlotte, N. C.

LUNKENHEIMER

OIL AND GREASE CUPS

For Engine AND Transmission Bearings

By their unfailing reliability have won the reputation they enjoy. The engineer specifying "Lunkenheimer" *knows* that bearings thus equipped will get the amount of lubricant for which the feed is set, and that no further attention is necessary other than filling.

They are practical and durable; the feed regulation is simple and easily adjusted, and there is no danger of unsetting the feed when refilling.

The variety of types made embraces *Oil Cups*, with Glass or Bronze Body, with or without Sight feed; and *Grease Cups* of Bronze, Iron and Steel, with Screw or Spring Compression feed — a type for every service requirement.

Write "Lunkenheimer-equipped" in your engine and transmission specifications, and insist on having the genuine.

Descriptive Booklets Nos. 523 and 524-AK will assist you in selecting the proper types. Write for copies.

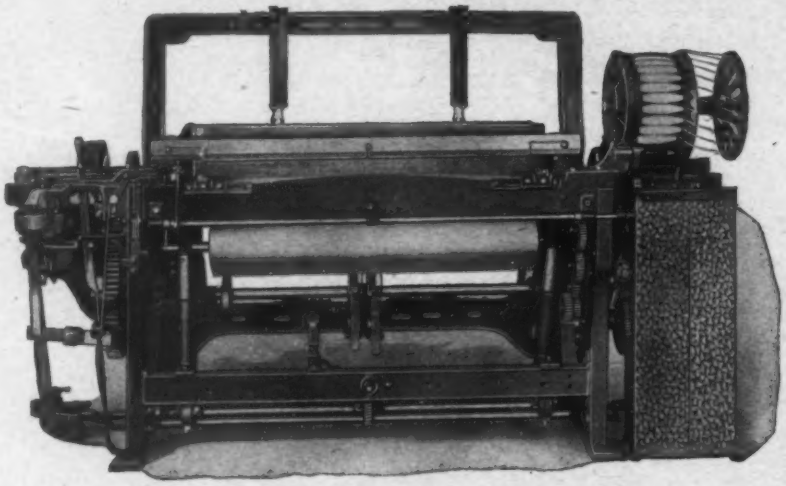
THE LUNKENHEIMER CO.
"QUALITY"

Largest Manufacturers of High Grade Engineering Specialties in the World

CINCINNATI

New York Chicago Boston London

23-12-10



MASON AUTOMATIC LOOM

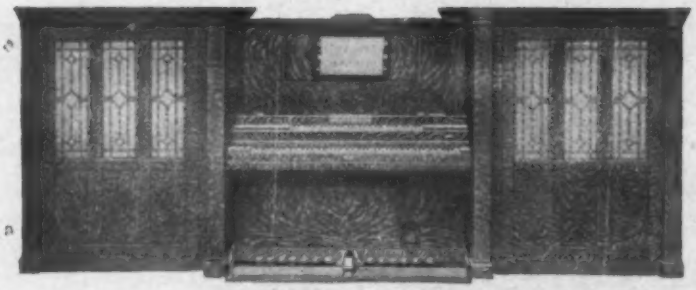
With Battery, Warp Stop Motion, Feeler and Shuttle Lock
RANDOLPH CROMPTON'S PATENTS

Fewer Parts Standard Construction Rebounding Shuttles Overcome
Damage to Shuttles and Bobbins Overcome

Mason Machine Works **Taunton, Mass.**

E. HOWARD, Southern Agent, Greenville, S. C.

SEEBURG AUTOMATIC MUSICAL INSTRUMENTS



Special Motion Picture Player.

Music for your
Motion Picture Theatre
Recreation Hall
Y. M. C. A.

SEEBURG ELECTRIC PIANOS, ORCHESTRAS and PIPE ORGANS are in a class by themselves. We specialize in Automatic Musical Instruments.

Write us for catalogue and prices.

SCOFIELD AUTO-MUSIC COMPANY

CHARLOTTE, N. C.

General Southeastern Agents,

"Sirocco"
TRADE MARK

In Southern Cotton Mills

Old time methods are giving way to new ideas. Yesterday's plans are being thrown into the discard because it is realized that business today must be handled along different lines from that of the past.

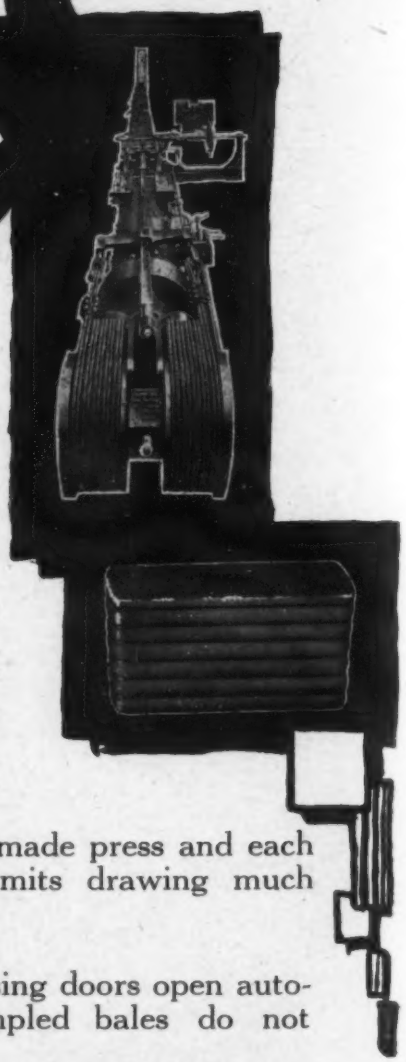
In the Cotton mill and Textile plant conditioned air is playing a big part in production. A higher quality of product and more helpful employees is the rule in a plant equipped with Sirocco Air Conditioning apparatus.

If it is a question of ventilating equipment one of our Sales Engineers located near you will give you definite information as to how Sirocco equipment can be utilized for your needs.

American Blower Company

DETROIT, MICH.

ECONOMY in BALING



With

Cummin's Horizontal Baling Press

Means economy in the fullest sense.

Means vastly superior pressing at less cost.

Means first—low cost—speed—compactness.

No foundation required—no pits needed—no erection tackle necessary—no upper story press house—works on ground floor—uses less coal, less hoop, less gunny per bale—NEEDS BUT ONE PRESSMAN—Will press any kind of fibrous material.

Press Made in Three Types—Rated 70 Bales per Hour—56 lbs Cubic Foot.

This is enormous capacity compared to any American made press and each bale is in one related whole, not in sections, which permits drawing much superior sampling.

ADVANTAGES

No tramping of cotton into press box—lashing and releasing doors open automatically—no revolving boxes—no cross packing—sampled bales do not have to be re-pressed for shipment.

SIMPLE SMOOTH SAFE

W. D. CRUMPTON, Inc., American Representative, 8-10 Bridge St., NEW YORK, N. Y

DAVID BRIDGE & CO. LTD.

MANCHESTER ENGLAND

300 Days' Labor Lost Each Week

That's 15,600 Days Each Year

National Marking Inks— BEST for all purposes.

TIME is money! You can save this tremendous PRODUCTIVE TIME that is lost when your workers stay home to wash and iron, if you install your own Mill Village Laundry, and do the work at cost. Your employees can earn more in the mill than they can save by staying home and washing.

Your Mill Village Plant can do all the washing for all of your employees—in a modern, sanitary fashion—all household pieces can be handled, as well as coats, aprons, uniforms—any garments used by your employees at their work.

In Arranging for Your Mill Village Laundry

be sure to include "National" Equipment, so that all garments can be IDENTIFIED. This will insure the return of every piece sent. Result: satisfied employees.

WE illustrate our Improved No. 8 National Power Marking Machine, which marks all articles neatly and indelibly. Write us today—let us advise you regarding a Mill Village Laundry.

TEXTILE DEPARTMENT OF

The National Marking Machine Co.

1068 Gilbert Ave. **General Offices** **Cincinnati, O.**

New York Office: 40-44 West Fourth St., New York City.

Boston Office: 100 Boylston St., Room 722, Colonial Bldg.

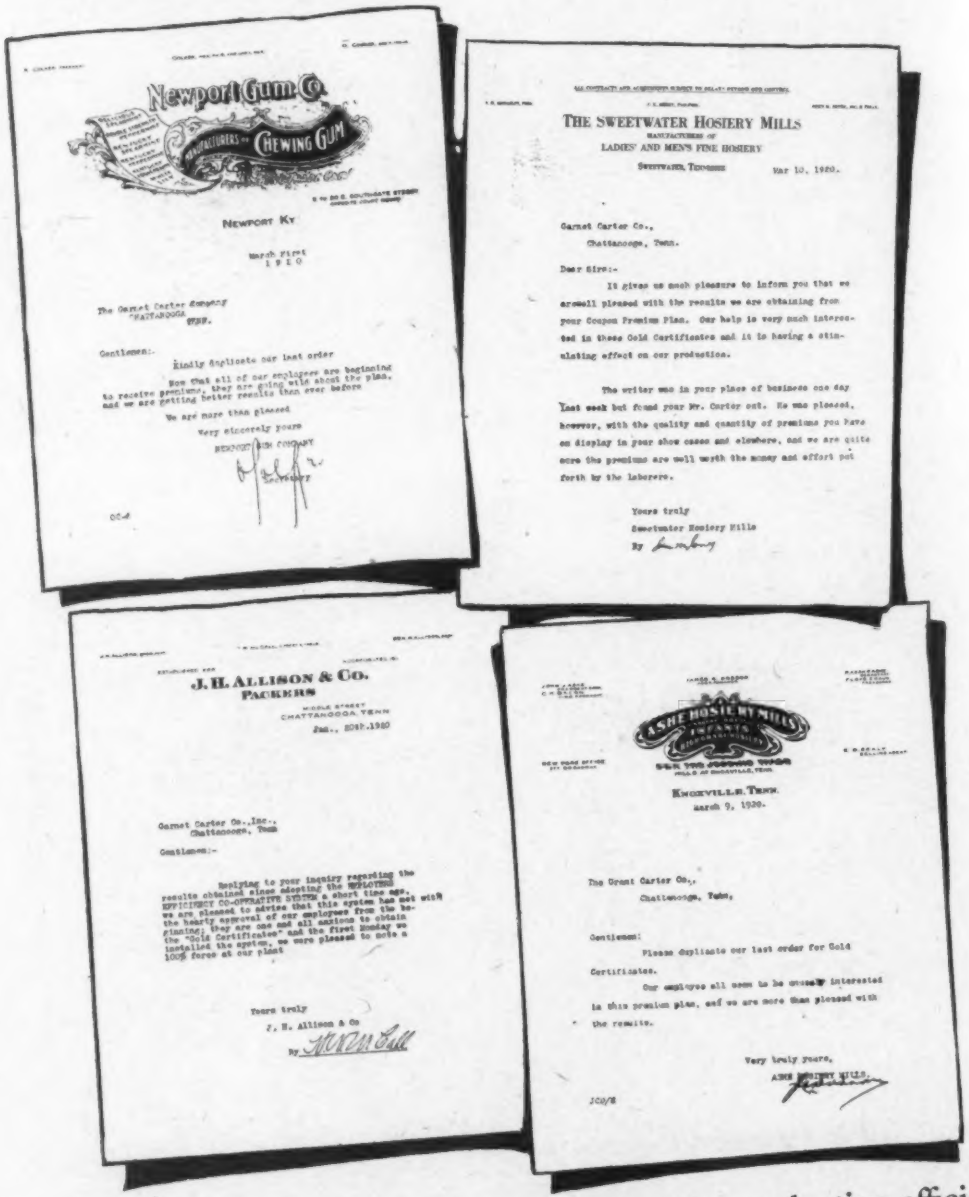
Chicago Office: 707-8 Cambridge Bldg., 160 N. Wells St.

Philadelphia Office: 125 N. 10th St.

GARNET CAR

INCOR

The most progressive manufacturers in their various lines heartily



Newport Gum Co.

MANUFACTURERS OF CHEWING GUM

NEWPORT KY

March First 1920

The Garnet Carter Company
CHATTANOOGA
TENN.

Gentlemen:-

Kindly duplicate our last order

Now that all of our employees are beginning to receive premiums, they are going wild about the plan, and we are getting better results than ever before

We are more than pleased

Very sincerely yours

NEWPORT GUM COMPANY

THE SWEETWATER HOSIERY MILLS

MANUFACTURERS OF

LADIES' AND MEN'S FINE HOSIERY

SWEETWATER, TENNESSEE Mar 10, 1920.

Garnet Carter Co.,
Chattanooga, Tenn.

Dear Sirs:-

It gives us much pleasure to inform you that we are well pleased with the results we are obtaining from your Coupon Premium Plan. Our help is very much interested in these Gold Certificates and it is having a stimulating effect on our production.

The writer was in your place of business one day last week but found your Mr. Carter out. He was pleased, however, with the quality and quantity of premiums you have on display in your show cases and elsewhere, and we are quite sure the premiums are well worth the money and effort put forth by the laborers.

Yours truly
Sweetwater Hosiery Mills
By

J. H. ALLISON & CO.
PACKERS
MIDDLE STREET
CHATTANOOGA, TENN.

Jan., 20th.1920

Garnet Carter Co.,Inc.,
Chattanooga, Tenn

Gentlemen:-

Replying to your inquiry regarding the results obtained since adopting the EMPLOYEE EFFICIENCY CO-OPERATIVE SYSTEM a short time ago, we are pleased to advise that this system has met with the hearty approval of our employees from the beginning; they are one and all anxious to obtain the "Gold Certificates" and the first Monday we installed the system, we were pleased to note a 100% force at our plant

Yours truly
J. H. Allison & Co
By

ASHE HOSIERY MILLS

KNOXVILLE, TENN.

March 9, 1920.

The Grant Carter Co.,
Chattanooga, Tenn,

Gentlemen:

Please duplicate our last order for Gold Certificates.

Our employes all seem to be greatly interested in this premium plan, and we are more than pleased with the results.

Very truly yours,
ASHE HOSIERY MILLS

JCH/H

If interested in productive efficiency we

GARNET CAR

INCOR

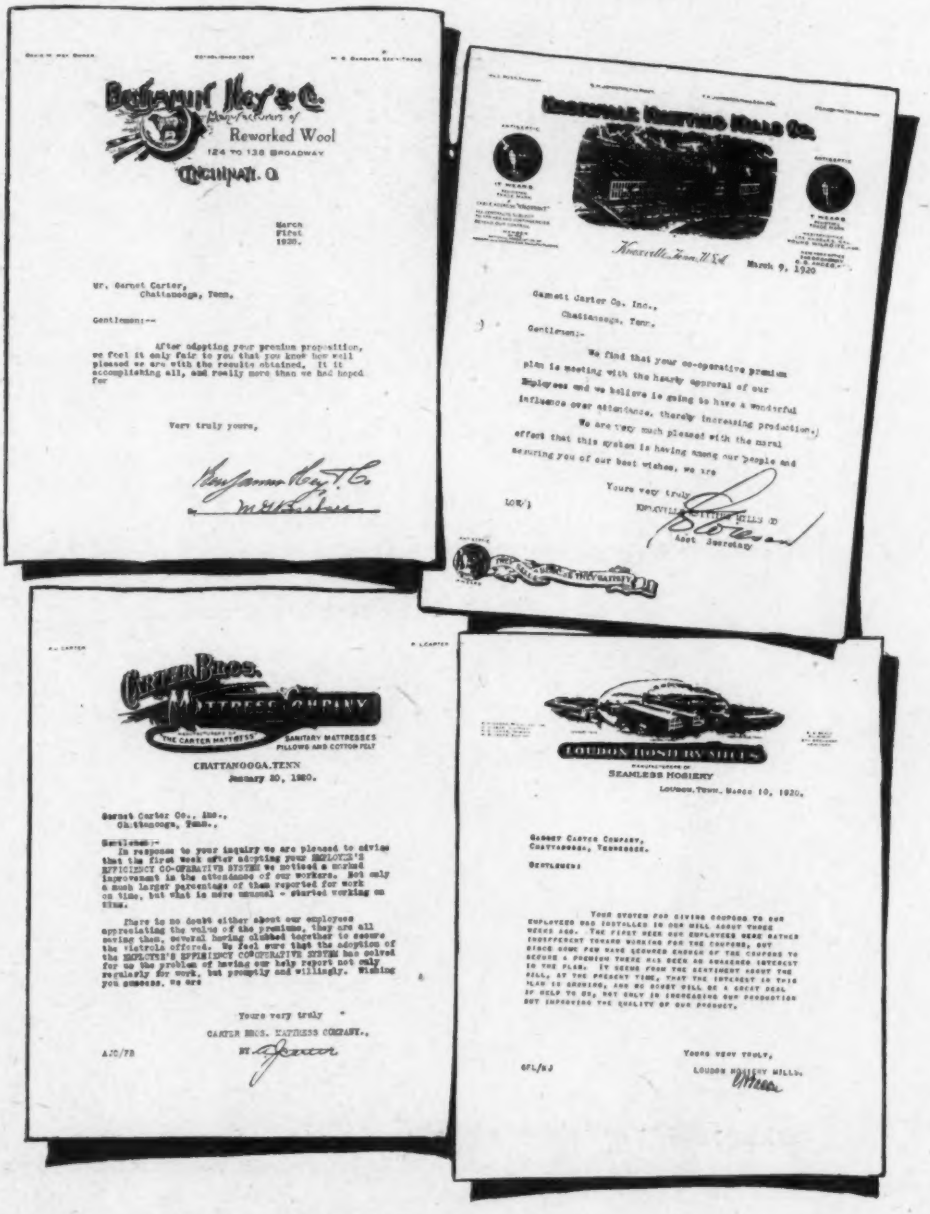
INCREASE PRODUCTION PROMO

CHATTANOOGA,

TER COMPANY

PORATED

endorse our Plan as the following unsolicited letters show:


Bettencourt Hoyt & Co.
Manufacturers of
Reworked Wool
124 TO 138 BROADWAY
CINCINNATI, O.

March First 1920.

Mr. Garnet Carter,
Chattanooga, Tenn.

Gentlemen:—

After adopting your premium proposition, we feel it only fair to you that you know how well pleased we are with the results obtained. It is accomplishing all, and really more than we had hoped for

Very truly yours,

Bettencourt Hoyt & Co.
By M. H. Bettencourt

Knoxville, Tenn. U.S.A. March 9, 1920

Garnet Carter Co. Inc.,
Chattanooga, Tenn.
Gentlemen:-

We find that your co-operative premium plan is meeting with the hearty approval of our Employees and we believe is going to have a wonderful influence over attendance, thereby increasing production.

We are very much pleased with the moral effect that this system is having among our people and assuring you of our best wishes, we are

Yours very truly
EMPLOYEES HOSIERY MILLS CO.
Asst Secretary

CARTER BROS. MATTRESS COMPANY
MANUFACTURERS OF THE CARTER MATTRESS SANITARY MATTRESSES PILLOWS AND COTTON FELT

CHATTANOOGA, TENN
January 20, 1920.

Garnet Carter Co., Inc.,
Chattanooga, Tenn.,

Gentlemen:-
In response to your inquiry we are pleased to advise that the first week after adopting your EMPLOYEE'S EFFICIENCY CO-OPERATIVE SYSTEM we noticed a marked improvement in the attendance of our workers. Not only a much larger percentage of them reported for work on time, but what is more unusual - started working on time.

There is no doubt either about our employees appreciating the value of the premiums, they are all saving them, several having clubbed together to secure the victrola offered. We feel sure that the adoption of the EMPLOYEE'S EFFICIENCY CO-OPERATIVE SYSTEM has solved for us the problem of having our help report not only regularly for work, but promptly and willingly. Wishing you success, we are

Yours very truly
CARTER BROS. MATTRESS COMPANY.,
BY

LOUDON HOSIERY MILLS
SEAMLESS HOSIERY
Loudon, Tenn., March 10, 1920.

Garnet Carter Company,
Chattanooga, Tennessee.

Gentlemen:

Your system for giving coupons to our employees was installed in our mill about three weeks ago. The first week our employees were rather indifferent toward working for the coupons, but since some few have secured enough of the coupons to become a premium there has been an awakened interest in the plan. It seems from the sentiment about the mill, at the present time, that the interest in this plan is growing, and we first will be a great deal of help to us, not only in increasing our production but improving the quality of our product.

Yours very truly,
LOUDON HOSIERY MILLS.

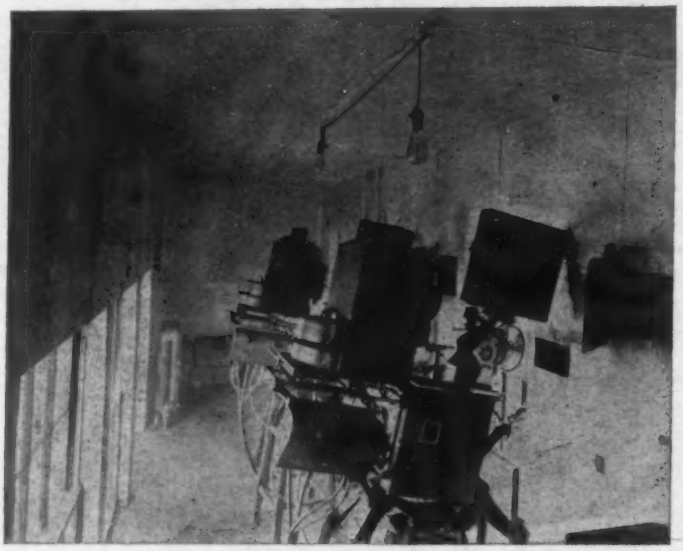
will be glad to furnish further information.

TER COMPANY

PORATED

TERS FOR THE MANUFACTURER

TENNESSEE



Showing Installation of Power's 6 B Motion Picture Machines in the Tucopou Mills Theatre

The Textile Industry Demands the Best

That is why—

More Power's Projectors are used by Cotton Mills in the South than all Projectors combined.

"We Have a Special Offer"

Our experience in Theatre equipment is at your service

Southern Theatre Equipment Company

No. Nine Nassau St.
ATLANTA, GEORGIA

Eighteen Fifteen Main St.
DALLAS, TEXAS

"Water—Water Everywhere And All Too Warm to Drink"

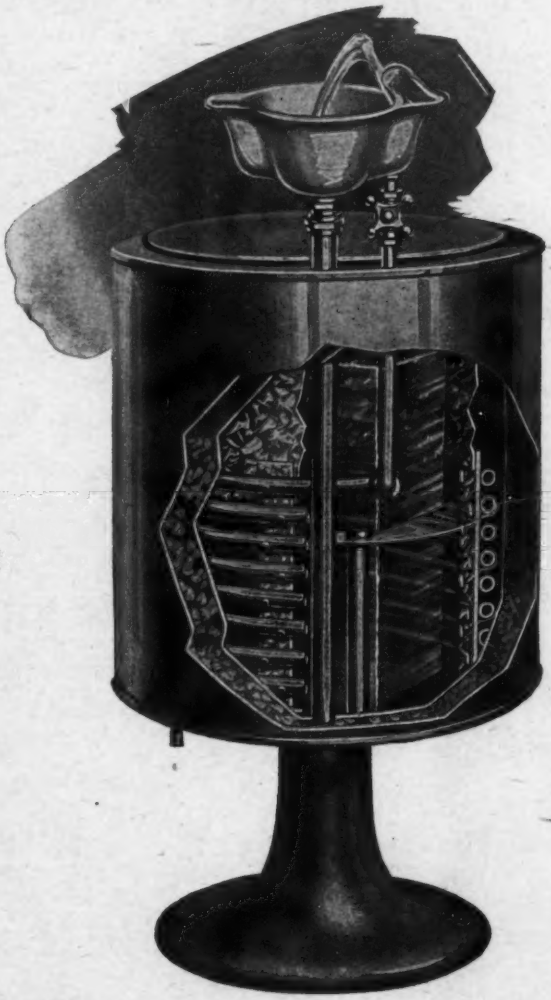
Cool, palatable Drinking Water served from sanitary Government approved PURITAN "CANTONMENT" FOUNTAINS AND COOLERS will go farther than any other thing to maintain your maximum production curve during hot summer months; besides making healthy, happy and contented employees.

PURITAN "CANTONMENT" FOUNTAINS AND COOLERS were designed to meet the demand of our Government for better drinking equipment for use in Cantonments, Naval Training Stations, etc.

We are the largest exclusive manufacturers of Drinking Equipment and, our fountains are installed in practically all of the country's largest organizations, including Schools, Parks, etc., etc.

—ILLUSTRATIVE LITERATURE UPON REQUEST—

Illustration is of our No. S-570 Cooler Fountain



Puritan Fountains and Coolers are without doubt the most efficient from every standpoint.

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"PURITAN" THE ONLY KIND YOU CAN AFFORD

ABSOLUTELY SANITARY

FOOL-PROOF PRACTICAL

Puritan DRINKING FOUNTAINS

Halsey W. Taylor Co.

Warren, Ohio.

Puritan DRINKING FOUNTAINS

"APPROVED AND ADOPTED BY ALL DEPARTMENTS OF THE ARMY AND NAVY"

HELP *your* HELP

and they will satisfy you

Provide Proper Recreation

---billiards and bowling
a clean sport

To exercise RIGHTLY *Means To PLAY!*

Bowling is the sport where you can PLAY and EXERCISE any old time —and regardless of the weather.

Let us Advise and Assist YOU in Providing

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that will

Keep YOU and YOUR EMPLOYEES

Physically Fit

Write for full information.

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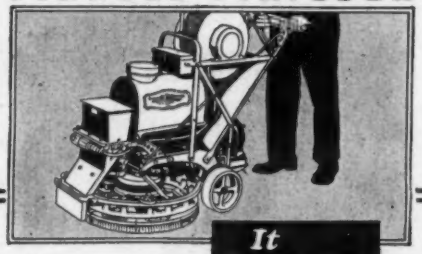
BILLIARDS AND BOWLING

FINNELL SCRUBBER



It SCRUBS *Electrically!*

The Money Value of

CLEAN FLOORS

in American Business

The Store of
JOHN WANAMAKER
Philadelphia, Pa.

One of the hundred different lines of industry where floors are FINNELL scrubbed.

Who, in any commercial institution, dares to ignore CLEAN FLOORS?

To do so is to reject a sales factor of tremendous force.

In stores, CLEAN FLOORS mean clean merchandise, clean salespeople, clean atmosphere, good cheer, courtesy—all of them builders of sales and good-will.

In factories, CLEAN FLOORS mean clean work and better work, happier workers and greater production.

In office buildings, CLEAN FLOORS mean clean tenants, happy, contented, profitable.

In hotels, CLEAN FLOORS give that most desirable atmosphere of home.

In whatever business, CLEAN FLOORS have a power of good that no business man can afford to overlook or overestimate.

When hand scrubbing and mopping were in vogue, CLEAN FLOORS were commercially impracticable—too expensive. But the Finnell System of Power Scrubbing has brought to American business untold blessings.

Hundreds of different lines of industry are today showing added profits traceable directly to CLEAN FLOORS.

We will gladly explain in detail. Writing for information does not obligate. Please address Chicago office.

AMERICAN SCRUBBING EQUIPMENT CO.

Also manufacturers of Finola Scouring Powder

General Offices: 188 N. Wabash Ave., Chicago Factories: Hannibal, Mo.

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BOSTON	CINCINNATI	INDIANAPOLIS	MILWAUKEE	NEW YORK	PROVIDENCE	SEATTLE
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"CLEAN FLOORS Reflect Clean Business"

FINNELL SYSTEM

OF POWER SCRUBBING

The Way to Speed Up Shipments

The best way to speed up shipments is to take advantage of the McKinney One-man Trucking Service. With a McKinney One-Man Truck, one man can pick up, haul and unload heavy boxes, barrels and bales without a single stroke of assistance and in half the time ordinarily required. The extra helper or loader—the 50% efficient worker is eliminated!

This means you double results without adding more men to your trucking force. Every McKinney One-man Truck furnishes the worker with an extra pair of hands.

Notice the illustration above. The long steel package holder just below the handle does the work the extra helper used to do. It is readily adjusted to any type of merchandise. It grips the load to be moved. Then the trucker places his foot on the pedal down near the bottom, pulls back on the handle and the merchandise is held tightly in place—perfectly balanced—ready to be moved to its new position.

McKinney One-Man Trucks are of light rugged construction, easily operated and suitable for handling any kind of merchandise under the most difficult trucking conditions.

McKinney One-Man Trucks are used by thousands of concerns where up-to-date time and labor saving systems are in operation. It cuts trucking costs in half and makes it possible for your men to do twice as much work with less effort and no strain.

Our illustrated catalog, "The One-Man Method" will answer your particular trucking problem. Send us your name and address and we will forward you a copy of this interesting booklet.

McKinney Manufacturing Co.
Pittsburgh

THE LOVINGOOD COMPANY
14 Walker St., Atlanta, Ga.

Also manufacturers of McKinney Hinges and Butts, garage and farm building door-hardware and furniture hardware

McKINNEY *one-man* TRUCKS

Unloading cloth from a Packard Truck. The Packard with its ability to deliver 6700 pounds traction to the rear wheels—as against 4700 pounds delivered by the average truck—is far better prepared to handle capacity loads without overstrain

What Will Replacements Cost the Textile Manufacturer

TEXTILE manufacturers of today—with the future of their business always in mind—are building for permanency in every department.

Especially in the trucking department—where renewals tax the profits so heavily — they want such materials and methods as will insure long and economical truck life.

* * *

The Packard people are primarily *transportation engineers.*

The basis of the Packard Truck is *unified engineering*—not merely a blue print and specifications of commercial parts; but Packard engineering design and Packard control of every Packard part.

Packard frames of *rolled* channel steel—not commercial pressed steel.

Packard live axles of special steel, *heat-treated* in furnaces designed by Packard. Tensile strength — 220,000 pounds to the square inch.

Packard Engine both *strong* and *simple.* Four crank shaft bearings, as against the ordinary three.

One cam shaft only, and but *three* timing gears, in the Packard.

All valves *enclosed,* and with automatic lubrication.

Packard clutch and universal joints enclosed. The clutch of dry multiple disc type, with *extra-large* clutch surface. No leather, and nothing exposed.

Packard *four-speed* transmission, with *even* ratios—as against only three speeds and uneven ratios.

Packard gears *forged* and *heat-treated* by *unique* methods that give 10 to 20 per cent above average shock resisting ability, steady load value and long life.

* * *

These facts mean long truck life.

They mean also economical and enduring transportation equipment for the Textile Manufacturer.

And they insure his profits against costly replacements of trucks worn out in only two or three years of service.

"Ask the Man Who Owns One"

PACKARD MOTOR CAR COMPANY, *Detroit*

Storage Battery Trucks—Better and Cheaper

Today, it is the electric truck that assures prompt and economical haulage and delivery.

For city service with its many stops, waits and short hauls, the electric truck has proved dependable, with lowest upkeep cost and the highest service efficiency.

Edison Storage Batteries

with their ***steel*** and ***iron*** construction assure the greatest number of working days from your electric trucks.

It is this rugged strength of Edison Storage Batteries that keeps your electric on the job.

Our Bulletin 500-AD will show you why many firms have chosen Edison equipped electric trucks for their delivery systems. Write for it TODAY.

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Edison Storage Battery Co.

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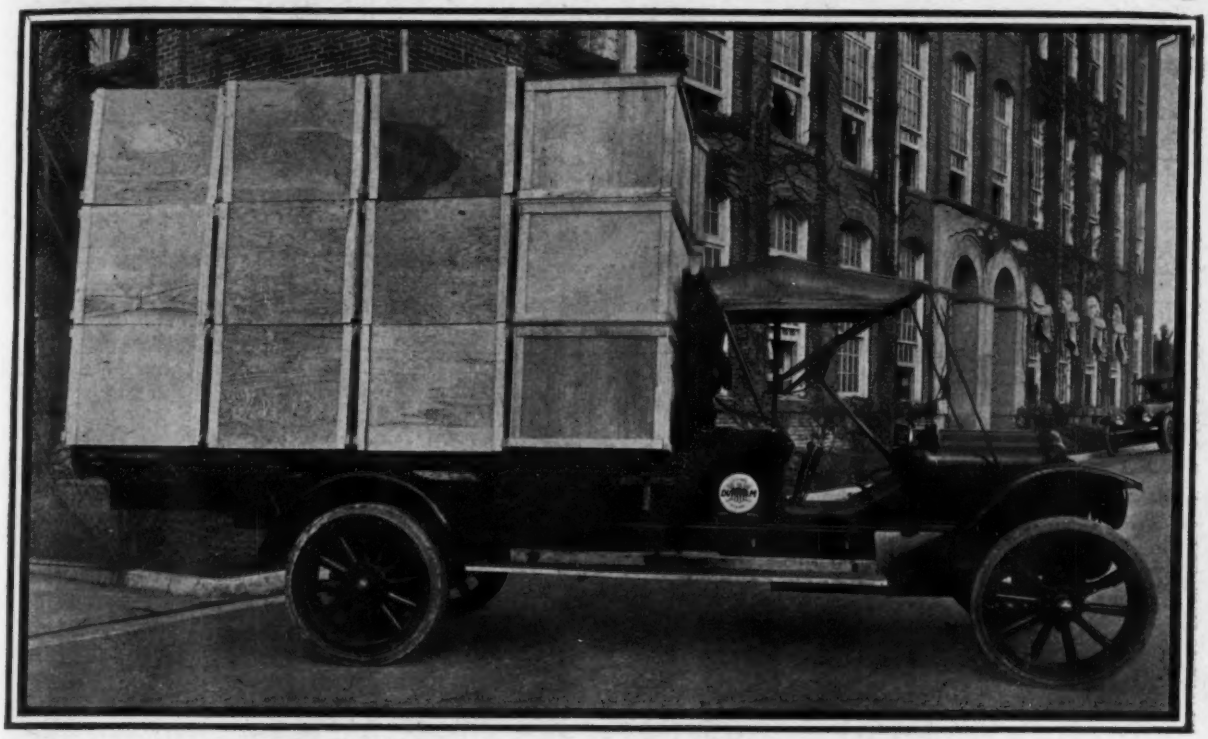

One of a fleet of Four Whites owned by The Durham Hosiery Mills Co., Durham, N. C.

WHITE *has the* OWNERS

THE real merit of a motor truck is strongly reflected in its owners. The Annual Roll Call of White Fleets in actual service is graphic proof of the most remarkable truck ownership in America, as remarkable for the quality of that ownership as for its extent and steady growth from year to year.

The Roll Call, including only owners of ten or more White Trucks, lists 350 concerns with a total of 12,674 Whites. All together there are 3,691 White Fleets comprising 40,919 trucks, exclusive of single-truck installations.

Behind it all there is one decisive reason: White Trucks do the most work for the least money.

THE WHITE COMPANY
CLEVELAND

White Trucks

Dodge Standard Split Pulley

A CAST IRON PULLEY SOLD FROM STOCK

with Interchangeable Split Bushings

TRUE IN BALANCE

Here is the only metallic pulley that will maintain a perfect balance under all conditions.

The Standard Split Pulley will grip the shaft without the necessity of keyways; it will last forever in service because of the total absence of rivets or other parts to crystallize or wear off.

Buy this pulley from your dealer's stock; the interchangeable metallic bushing system permits its use upon any size of shaft within its range of bore.

DODGE

Dodge Sales & Engineering Company, distributor of the products of the Dodge Manufacturing Company and the Dodge Steel Pulley Corporation. General Offices: Mishawaka, Ind. Works: Mishawaka, Ind., and Oneida, N. Y.
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Philadelphia Cincinnati New York Chicago St. Louis Boston Atlanta Pittsburgh Minneapolis Dallas Providence Seattle Newark

Figure this out for yourself. What would be the cost of a half day's shutdown of your plant? A pretty big sum it would be—wouldn't it? Now, suppose that shutdown were due to a failure of the belt on your main drive. It's a pretty big item to charge up against one belt, isn't it? Probably a few dollars more paid for a better belt, in the first place, would have saved you that shutdown. Moral—better belts are worth many times more than the price paid for them. Ladew Leather Belts are "better" belts. Thousands of hard-headed belt users say they are the "best" belts.

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GLEN COVE, NEW YORK, U.S.A.

Branches and distributors in all principal cities of the world carry complete stocks. See your 'phone book for local address.

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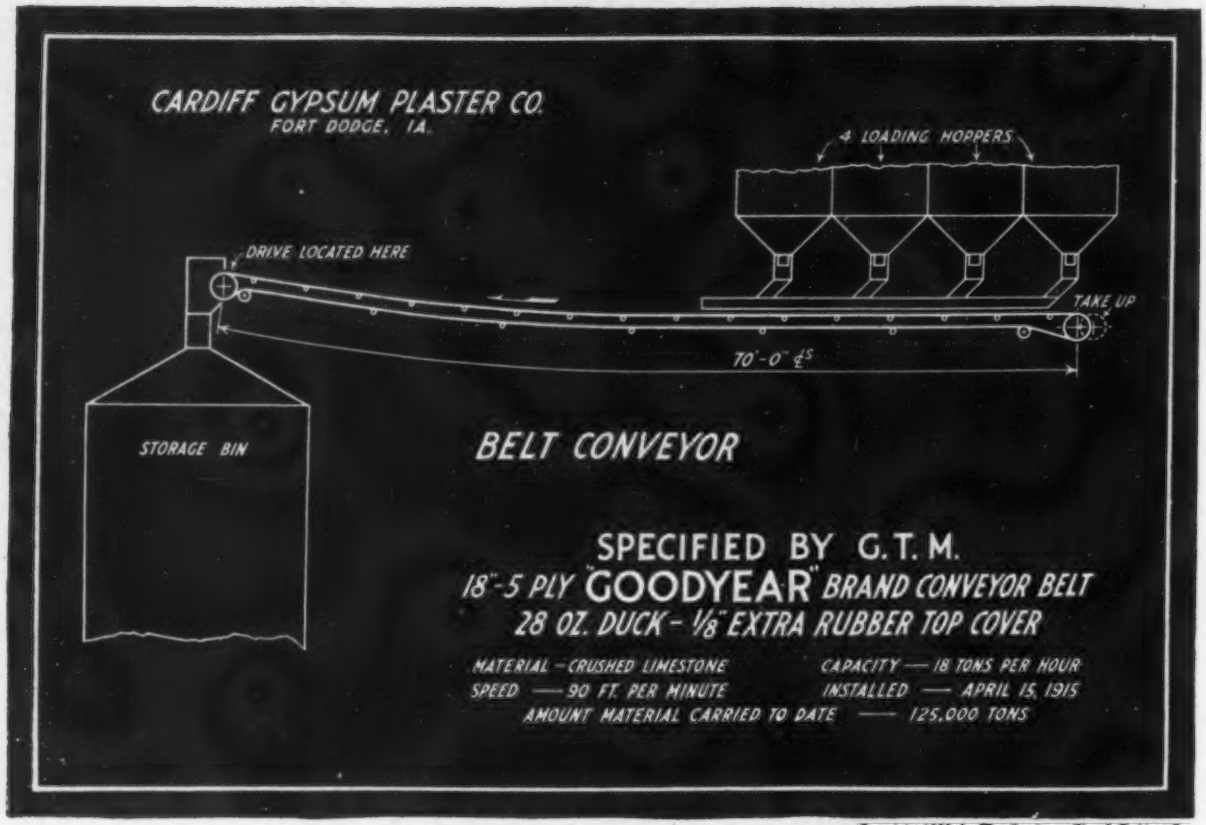

CARDIFF GYPSUM PLASTER CO.
FORT DODGE, IA.
4 LOADING HOPPERS
DRIVE LOCATED HERE
TAKE UP
70'-0" CTS
STORAGE BIN
BELT CONVEYOR
SPECIFIED BY G.T.M.
18"-5 PLY "GOODYEAR" BRAND CONVEYOR BELT
28 OZ. DUCK - 1/8" EXTRA RUBBER TOP COVER
MATERIAL - CRUSHED LIMESTONE
CAPACITY — 18 TONS PER HOUR
SPEED — 90 FT. PER MINUTE
INSTALLED — APRIL 15, 1915
AMOUNT MATERIAL CARRIED TO DATE — 125,000 TONS

Copyright 1920, by The Goodyear Tire & Rubber Co.

125,000 Tons of Stone — and the G. T. M.

The requirements called for a belt with character. The G. T. M.—Goodyear Technical Man—could see that, from the very beginning of his study of the original conveyor installation for the Cardiff Gypsum Plaster Company, at Fort Dodge, Ia.

The conditions of service would be unusually severe—handling gritty, abrasive limestone, fed to the conveyor in sharp lumps averaging two inches in size. No previous experience in this mill furnished a working basis for suggestions. This was as much a test of the Goodyear Plant Analysis Plan as it would be of the belt.

You may be sure that every item affecting the efficient operation of that conveyor went into the G. T. M.'s calculations. The officials gave him full access to plant records. He figured the belt speed per minute—90; the diameter of head and tail pulleys—20 inches; their nature—bare; atmospheric conditions—damp; method of loading—from four automatic chutes; condition of bed—level; all equipment in first-class shape and well attended; weight of load—110 lbs. to the cubic foot; tonnage to be carried—18 tons per hour—day in, day out—10 months a year.

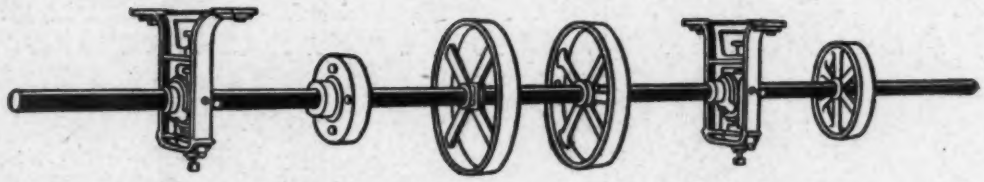
The belt he recommended is the 145-foot Goodyear Conveyor that is in operation today with five years of trouble-free service to its credit, and a record of more than 125,000 tons conveyed. It has gone on working amid the prevailing damp with all the unconcern of its moisture-proof construction. Judging by its condition today, Supt. C. C. Collins estimates that this 18-inch, 5-ply, 1/8-inch cover Goodyear Conveyor will stand up just as consistently to six years more of service.

Goodyear Belt performance like this is not measurable in first cost. The Cardiff Company's officials noticed when the G. T. M. figured on their problem that the belt he prescribed cost a little more than other conveyors. But their investment of that little additional secured them a balanced belt, specified exactly to their conveying—an earner and a saver every hour of its life.

The G. T. M. and Goodyear Belts, the idea that squares with your needs and the belt that we build to protect our good name, are available for your conveying and transmission. For further information about the G. T. M.'s services, write to The Goodyear Tire & Rubber Company, Akron, Ohio.

BELTING · PACKING HOSE · VALVES

GOODYEAR



If Shafting Always Remained in Perfect Alignment!

—then hangers equipped with ordinary non-adjustable bearings would come much nearer fulfilling the purpose for which they were designed.

But the facts are that practically all line shafting runs very badly out of alignment causing non-adjustable bearings to bind the shaft. The result is excessive friction that cuts down production, wastes fuel, and eats into your dividends.

But this large loss—amounting in many cases to 25 per cent of all the power produced or bought—can be largely eliminated by the installation of S K F BALL BEARING HANGERS. For with S K F Ball Bearing Hangers the shaft rides almost frictionless not only when well aligned, but also under extreme conditions of misalignment. The inner race tilts with the shaft—the bearing can never bind.

Other economical features of S K F Hangers which reduce textile production costs still further, and add an additional profit on every yard produced, are longer life, lower maintenance cost, and a material saving in lubrication.

S K F INDUSTRIES, INCORPORATED
Sales, Service and Research Division
165 Broadway, New York

595-C

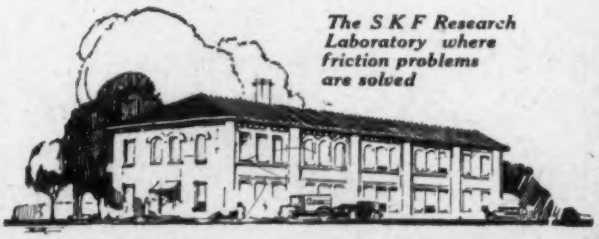
SKF INDUSTRIES

Hess-Bright Ball Bearings
S K F Ball Bearings
Atlas Steel Balls
Gronkvist Chucks
Transmission Hangers

A SERVICE THAT CONTEMPLATES MORE THAN THE SALE OF A BEARING.

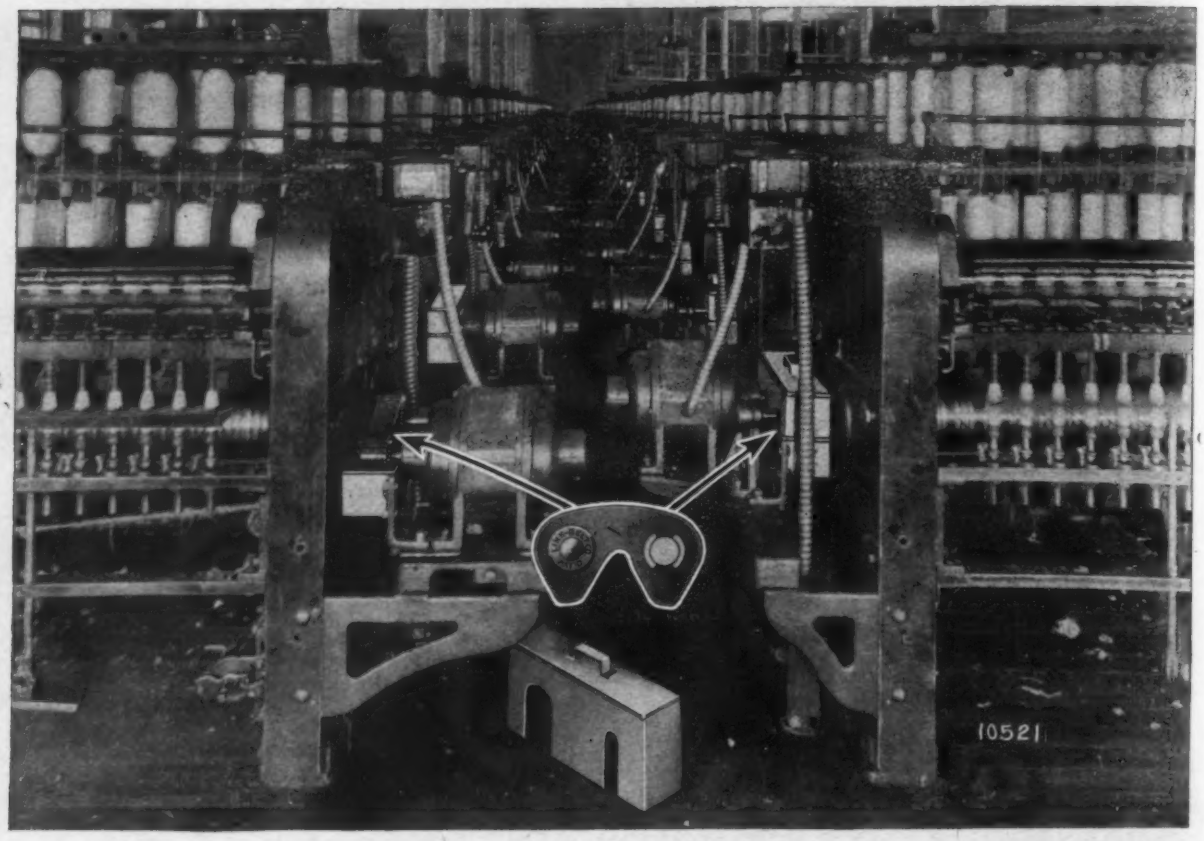
Every S K F Industries service-salesman is a plant engineer equipped to consult on your power transmission problems. S K F Service made available through these men is built on a laboratory-backed ideal that seeks to increase American output by lifting the friction load from industrial machinery.

Manufacturers are invited to avail themselves of this freely offered co-operation.



The S K F Research Laboratory where friction problems are solved

Efficient Power Transmission



CAN you afford, after purchasing a highly-efficient motor, to connect it to your machine or lineshaft with a transmission belt that will waste from 10 to 25 per cent of its power, when a Link-Belt Silent Chain Drive will transmit 98.2% of the power, under any conditions of load?

Briefly, these ten facts should be remembered about Link-Belt Silent Chain—It is 98.2% efficient (on actual test)—Permits convenience of location of driving parts—Any reduction in speed is possible—Makes for uniformity of product—Increases production of machines—Results in economy of power—Saves space—Oftentimes lowers first cost of motors on account of large speed reductions possible—Not restricted to motor drives, but suitable, for instance, for driving from lineshaft to lineshaft—Overloads taken care of without reduction of speed.

For full particulars write for Link-Belt Silent Chain Data Book 125.

LINK-BELT COMPANY 513

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LINK-BELT
SILENT CHAIN DRIVES

THE CHICAGO LINE

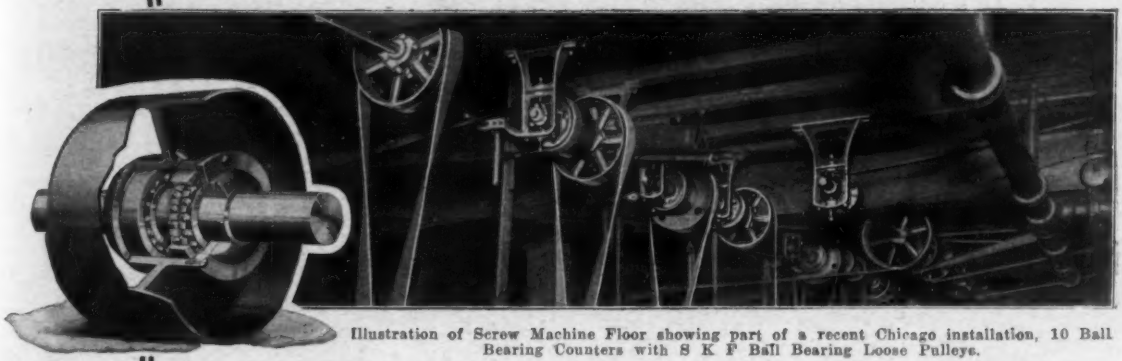

Illustration of Screw Machine Floor showing part of a recent Chicago installation, 10 Ball Bearing Counters with S K F Ball Bearing Loose Pulleys.

S K F Ball Bearing Loose Pulley

Lintproof *Dustproof*

With the remarkable manufacturing advancement in the Southern States, old-time methods are giving way to more efficient, more product producing operation.

Power losses are being considered as never before—old-time power transmitting appliances are giving way to modern S K F BALL BEARING equipment which has proven more efficient and has demonstrated a saving of power, money and time.

The S K F BALL BEARING LOOSE PULLEY is simple in construction—accurately machined, and built of the most durable material obtainable. They are lintproof, dustproof, noiseless, and require a very small amount of lubrication each year.

With very little attention S K F BALL BEARING LOOSE PULLEY will give day-in day-out service without heating, sticking, or wearing the shaft.

Get in line. Modernize. Use our trouble-free BALL BEARING power-saving appliances.

The Chicago Pulley & Shafting Co.

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Chicago

FACTORY
Menominee Falls
Wisconsin

THE CHICAGO LINE CP&S CO POWER TRANSMISSION

Pioneers in Ball Bearing Power Transmitting Appliances

The Drive of Efficiency

MORSE CHAINS

The Drive of Durability

Positive as Gears

Flexible as a Belt

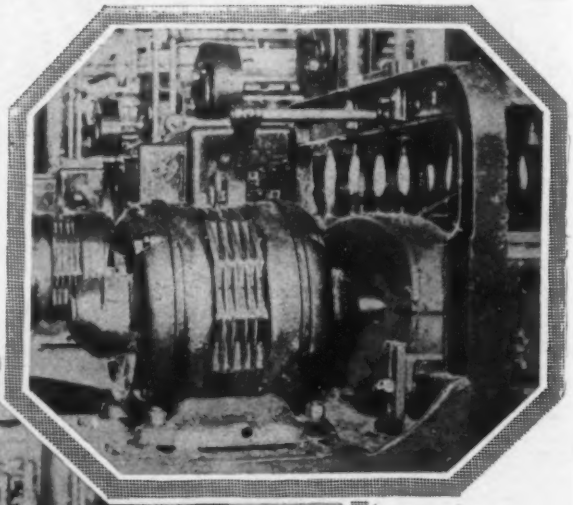
Longer Life

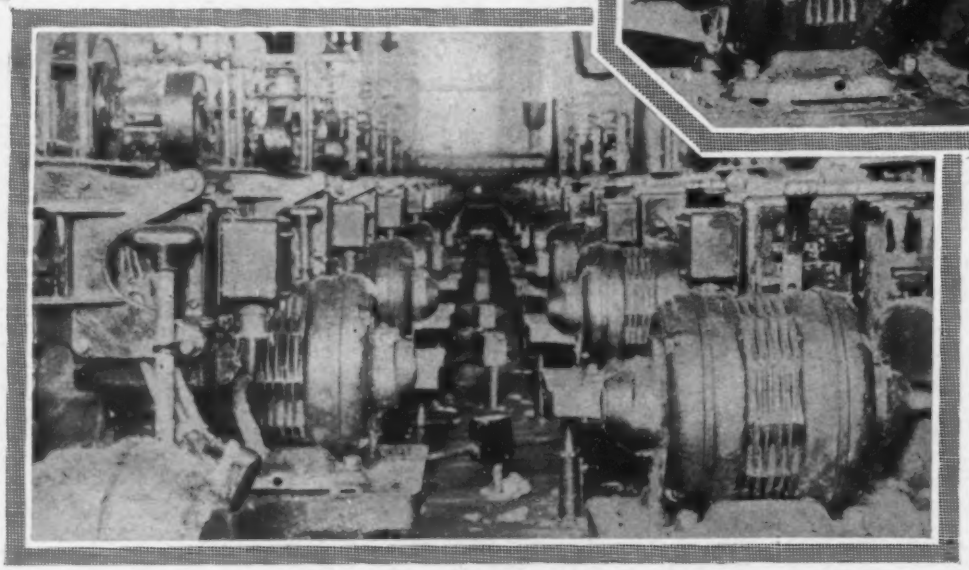
Without Slip, The Time Keepers of Production Bring out the Profits that are concealed by the slipping Belt

FOR Economy in space and Economy in Upkeep.

CLEAN, QUIET.

Runs Cool. Oil Baths Not Required





Lockwood, Greene & Company Engineers

Lynchburg Cotton Mill Company, Lynchburg, Va.

"Uniform Speed Increasing Production. Quiet Running Without Jars or Slip Increasing Quality"

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MORSE CHAIN CO., Largest Manufacturer of Silent Chains in the World **ITHACA, N. Y.**

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"Morse is the Guarantee Always Behind the Efficiency, Durability and Service."

In these strenuous times early specifications of requirements are very desirable to insure prompt deliveries.

"Pioneer" STEEL HANGER

"I've handled all kinds of hangers since I started millwrighting; but these 'Pioneer' Steel Hangers are my choice. Why? The answer's easy. I can hang them all day and alone if necessary. These old-fashioned cast-iron hangers seemed to weigh a ton around three o'clock in the afternoon. It took three of us to handle them, too. It's different now; the boss uses 'Pioneer' altogether. They're safe; and I never yet heard of a 'Pioneer' coming down — and that's a mighty good point. The difference in first cost is in favor of the 'Pioneer,' so they are preferable every way you look at them."

Ask for our booklet "Transmission Data." It's worth reading.

"I'll Take the Steel Hanger Every Time"

STANDARD PRESSED STEEL CO.

PHILADELPHIA, U. S. A.

Sixty-fifth

Service and Quality made these houses possible

1855 — CRANE

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Steam Specialties

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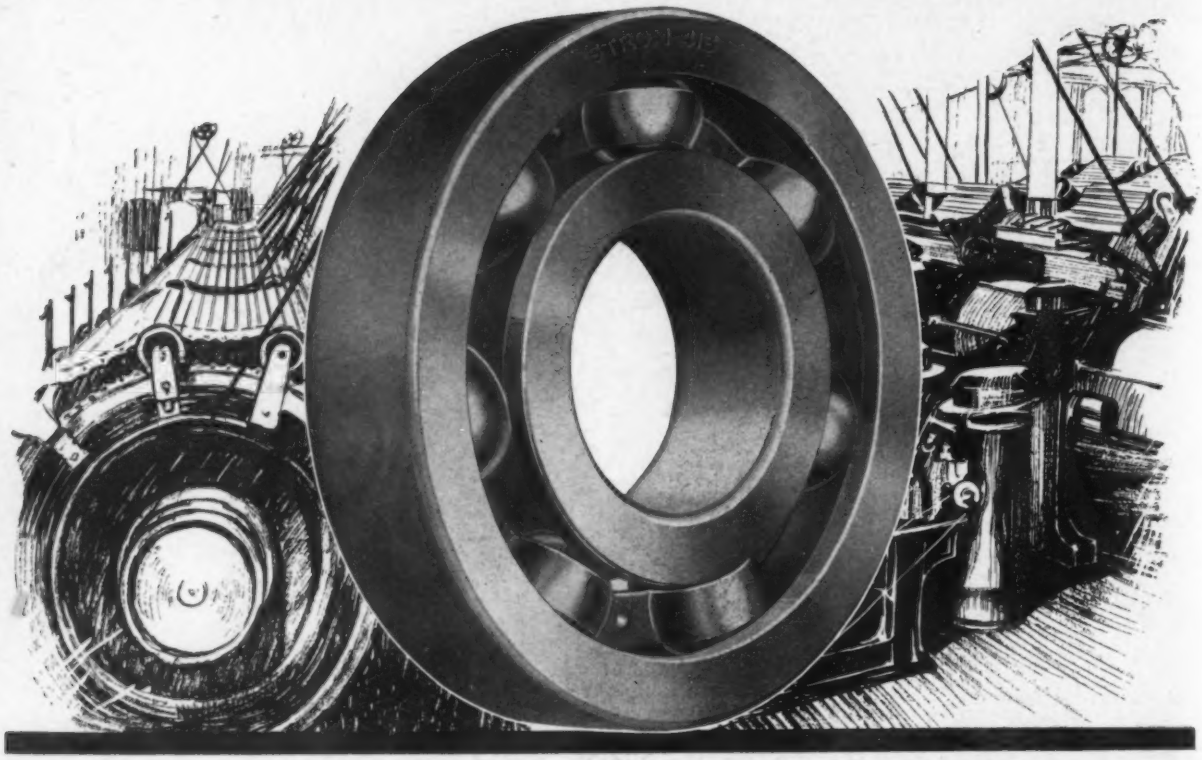


Applied to Textile Machinery, Strom Bearings Have Proved Their Worth in Many Southern Cotton Mills

Strom Bearings of rugged and accurate construction, with deep-grooved raceways and large balls are almost frictionless. They are particularly well suited to machines where accurate adjustment is essential to uniformity of product.

Time has proved Strom Bearing superiority on picker beaters and fans. They save power, oil, time, labor, and material, and practically eliminate maintenance expense. They permit an absolutely exact and permanent adjustment of beaters. which means even lap and smooth selvedge.

They keep all the oil in the box and off the lap. They eliminate shutdowns caused by hot boxes and avoid danger of fire from chokes. They pay for themselves in less than two years.

Strom Bearings for textile equipment in the Southern Territory are distributed through the ALDRICH MACHINE WORKS, Greenwood, S. C., which company will supply you with the bearings complete with housings and everything necessary to fit the machines now in your mill.

Write to them today for further information and prices.

U. S. BALL BEARING MFG. COMPANY
(Conrad Patent Licensee)
4535 Palmer St., Chicago, Ill.

Strom BEARINGS

Exact Science Produces The Modern Lubricant

WITH the passing of old styles of textile machinery in favor of improved and better types, common greases and wasteful oil had to be discarded in favor of the scientific product.

TRADE MARK REGISTERED IN
NON-FLUID OIL
UNITED STATES PATENT OFFICE

Special Textile Lubricants

Non-Fluid Oil overcomes the need of constant reoiling necessary when fluid oils are used, because it does away with the dripping and spattering of fluid oil. Non-Fluid Oil saves not only time and lubricant, but prevents oil stains on goods in process.

Common grease simply will not do, because it cannot lubricate until partly melted so increases friction and wastes power.

If your mill uses NON-FLUID OIL you should be sure that it is used on all textile machinery. We will be glad to make suggestions as to what grades to use on any given machine. Write and ask us for all the information you need.

If your mill is one of the few still struggling with the old lubrication methods—Write and ask us for testing samples of NON-FLUID OIL. A few selected grades for the various types of machinery will yield big dividends in improved lubrication.

Ample Stocks at Our Branches
CHARLOTTE, N. C. ATLANTA, GA.
NEW ORLEANS, LA.

New York & New Jersey Lubricant Co.
401 Broadway, New York

there is a Texaco Lubricant

for every mechanical appliance

in the mill—

from Opener to Cloth Room

—as well as in the Power Plant.

Consultation** with Texaco Lubrication Engineers Regarding any or all of your Lubricating Requirements is **Invited.

The Texas Company

Dept. O, 17 Battery Place, New York City

New York Chicago Houston

Offices in Principal Cities.

Aladdin

Employees of the American Beet Sugar Co. Get Aladdin Readi-Cut Houses

When the housing shortage made itself felt at Rocky Ford, Colorado the American Beet Sugar Company came to the aid of its foremen and high grade employees by providing suitable quarters for them close to their employment.

Aladdin Readi-Cut homes were purchased because of the quality and many other advantages connected therewith. ***Since the initial order for houses was completed additional orders for more Aladdin houses have been received from this customer.***

Many firms will find it advantageous to take similar interest in housing their employees. For obtaining quick service, guaranteed complete delivery, best quality material and all-round satisfaction, bring that housing problem to Aladdin.

When you are ready to consider your housing problem bear these facts in mind.

Aladdin—

—expedites your building project—
—houses your men well and quickly—
—saves 18% of the cost of lumber—
—saves 30% of the labor cost—
—reduces the skilled labor required—
—guarantees complete shipment of material—
—guarantees the quality—
—carries material for 1000 houses in stock—
—ships from the nearest timber region—

—quotes definite prices on any order from one house up to a city of 3000, including churches, schools, offices, water and sewage systems, electric plants, street and house lights, heating plants, street parks, trees, lawns, etc., complete.

Write, wire or phone for Aladdin catalog No. 1537.

The Aladdin Co.

OFFICES AND MILLS AT
Bay City, Michigan
Wilmington, North Carolina
Hattiesburg, Mississippi
Portland, Oregon
Toronto, Ontario

ALADDIN 45 YEARS OF HOUSES Sold By The GOLDEN RULE

Industrial Housing

The Attractive Mill Village

is an important factor in securing labor.

THE tendency of the times is toward beauty—and it is universal. Formerly it was characteristic of the wealthy. Now it has found its way into the homes of all classes. The attractiveness of the home, its surroundings and the village as a whole, will play an important part in your labor problems of the future.

The interest of the mill demands *lasting qualities* in the construction of homes for its operatives.

Human nature demands *convenience* of arrangement.

Comfort is the inherent right of every human being.

Strictest *economy* at a time of high costs is highly essential in all construction.

All These—Beauty, Durability, Convenience, Comfort, Economy

are the principal features of

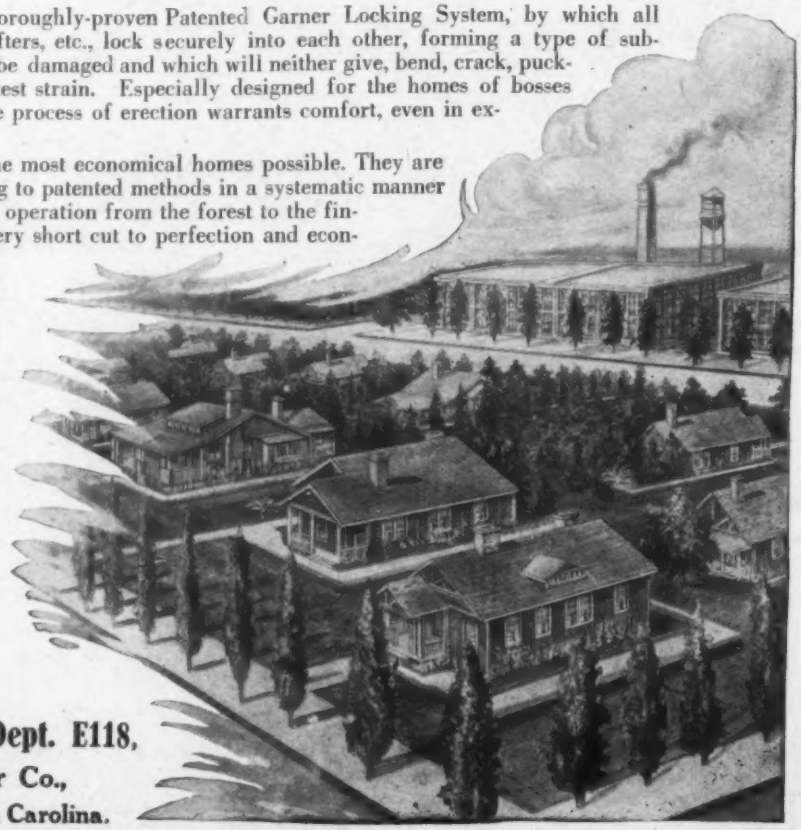
QUICKBILT BUNGALOWS

Snug, attractive, well-planned, artistic, roomy little bungalows especially designed for attractive, industrial villages.

Built after the practical, thoroughly-proven Patented Garner Locking System, by which all sleepers, joists, panels, plates, rafters, etc., lock securely into each other, forming a type of substantial home that cannot easly be damaged and which will neither give, bend, crack, pucker nor warp, even under the greatest strain. Especially designed for the homes of bosses or operatives. The doubly secure process of erection warrants comfort, even in extremes of hot or cold weather.

QUICKBILT Bungalows are the most economical homes possible. They are made in large quantities according to patented methods in a systematic manner by a plant which covers the entire operation from the forest to the finished house. As a result with every short cut to perfection and economy afforded the cost of manufacture is cut in half and all extra middle-men's profits and commissions are avoided. They are sold direct to you from the forest.

Arriving already built with nothing left but the erection, the labor usually necessary for construction is reduced to a minimum. There will be no piles of waste lumber left. Every waste in material, time, labor and money is avoided.



The Most Logical, Modern, Practical, Economical Method of Home Building.

For fuller explanation address

QUICKBILT Bungalow Dept. E118,
A. C. Tuxbury Lumber Co.,
Charleston, - - South Carolina.

A FEW FACTS TO THOSE CONTEMPLATING BUILDING

It was twenty-one years after the Civil War before building costs came back to pre-war levels; so that if they ever come back it looks as though we have twenty years to wait.

Building costs have gone up about One hundred per cent in the past five years. The rest of the H.C.L., food, clothes, etc., have increased about One hundred and seventy per cent; so your dollar today will buy more building than anything else.

Are building costs coming down? Not much, at least, for several years.

We need in the United States more buildings than can be met by present production of materials in the next ten years. We need hundreds of thousands of new houses—all the buildings necessary to supply increased community needs—everywhere that there is a call for increased production—there must be more building.

It is estimated, that at the present time, there are only 100 houses for every 120 families in the United States and it is claimed that with a normal increase in the population in the next five years, there will be only 100 houses for every 130 families in 1925; so you see it will take some time to supply this universal demand for increased housing facilities.

Our organization is in a position to handle ANY KIND OF A BUILDING PROPOSITION. We have devoted a lifetime to the study of industrial building which includes homes for employees of large industrial concerns and housing industrial enterprises.

FOR THE YEAR 1920, WE HAVE OVER ($12,000,000) TWELVE MILLION DOLLARS WORTH OF BUILDING UNDER CONSTRUCTION, which includes housing developments, mills, factories, warehouses, power stations, etc., in New England.

OUR ACTIVITIES COVER A WIDE FIELD from building up towns and villages in industrial communities to the construction of industrial plants, power houses, mills, factories and warehouses, waterworks and sewerage systems.

OUR ADVICE AND SERVICE ARE YOURS FOR THE ASKING; backed by twenty years of practical experience in the service of industries.

P. J. DONAGHEY & CO.

Established 1900

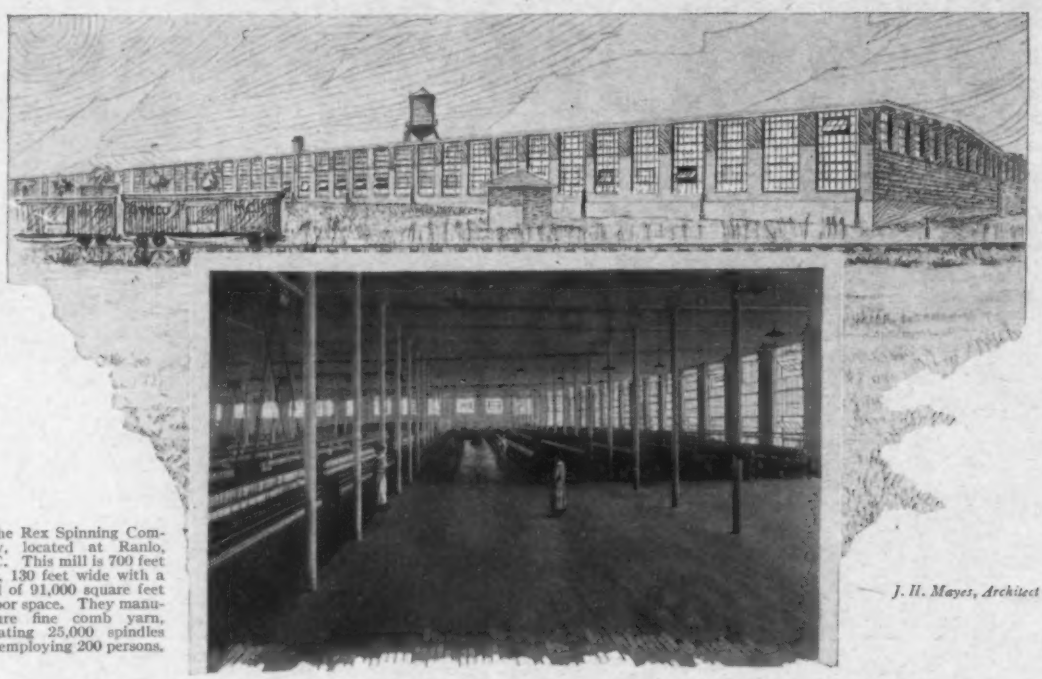
ENGINEERS, BUILDERS AND GENERAL CONTRACTORS

Industrial Housing — Industrial Plants — Power Houses — Reinforced Concrete

Sewerage Systems — Water Works

Mill, Factory and Warehouse Construction

36 BROMFIELD STREET, BOSTON, MASS. **21 BELL STREET, WOONSOCKET, R. I.**



The Rex Spinning Company, located at Ranlo, N. C. This mill is 700 feet long, 130 feet wide with a total of 91,000 square feet of floor space. They manufacture fine comb yarn, operating 25,000 spindles and employing 200 persons.

J. H. Mayes, Architect

"We Get 25% More Daylight——"

"OUR MILL is built with brick, steel and Fenestra Steel Sash. Fenestra Steel Sash is giving us satisfaction, and we get at least 25% more daylight than we could get with wood sash."

This statement was made by Mr. J. H. Mayes, secretary of the Rex Spinning Company, a prominent architect, and the designer of the Rex Mill.

Daylight and Ventilation have been long recognized as one of the most important factors in textile mill construction. The Rex Mill has secured both of these textile work-room requisites by following the WindoWall idea throughout. Large window areas, carried from almost floor level to the ceiling, admit daylight and pure fresh air generously. These light, airy, cheerful working conditions should be the aim of every mill owner.

Fenestra WindoWalls are an investment—not an expenditure. They pay dividends in the form of increased production, decreased spoilage, reduced fire hazard, improved morale and better quality of product.

A page from our new book, "WindoWalls—Their Cost and Their Advantages. This 30-page book gives an interesting and valuable comparison of Fenestra Steel Sash and wood sash costs. Send for a copy today.

Detroit Steel Products Company

4014 East Grand Boulevard, Detroit, Michigan

Fenestra

STEEL WINDOWALLS

ABERTHAW
CONSTRUCTION COMPANY
ATLANTA PETERS BUILDING

A 5,000 ton dry dock for the Bruce Dry Dock Company at Pensacola, Florida, has recently been completed by ABERTHAW.

The work was carried through in record time and at a satisfactory cost.

While of less magnitude than many other ABERTHAW *operations, the dry dock at Pensacola well illustrates The Company's ability to apply its methods of planning and supervising under all conditions of time, place, and structural design.*

The HIGHWAY *of* ACCOMPLISHMENT

A Built by ABERTHAW

THE picture of a building is evidence only that it has been built.

How well it has been built; with what skill of workmanship; with the provision of what safeguards for the client; under control of what organization, proceeding in accordance with what principles,—these questions no picture can satisfy. Yet they are absolutely vital to the man who would select a builder.

That is why ABERTHAW advertising places emphasis not so much on the static thing done, as on dynamically progressive methods of doing. For, in so far as these methods are right and rightly motivated, they inevitably lead to monumental accomplishment.

How the truth of this has been demonstrated in the experience of ABERTHAW is told, with ample illustration, in the ABERTHAW book *A Quarter Century of Fulfilment.* Other aspects of the Company are disclosed in *Clients of ABERTHAW* and in the brochure *Getting Together with ABERTHAW,* first published for the Company's personnel, but subsequently reprinted for restricted distribution.

Any or all of these may be had for the asking. Or a query will bring the general list of ABERTHAW publications, which will allow selection from a considerable field to meet a variety of general or technical interest.

ABERTHAW
CONSTRUCTION COMPANY
CONTRACTING ENGINEERS

BOSTON MASSACHUSETTS
ATLANTA PHILADELPHIA BUFFALO

6-100

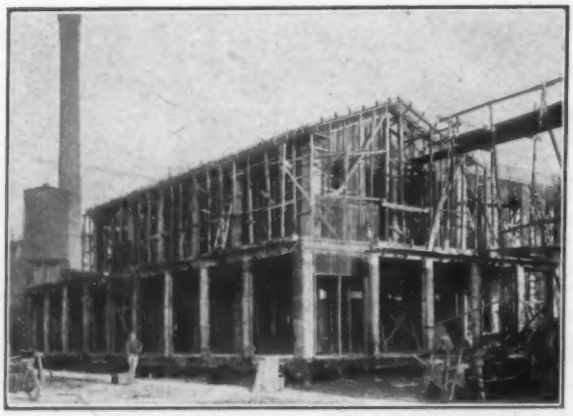
10-FAMILY APARTMENT HOUSE BUILT OF FORMLESS RE-INFORCED CONCRETE FOR AVONDALE MILLS

The Avondale Mills (Birmingham, Ala.) Again Show Their Faith in the *Permanence* and *Economy* of

ENSLEY BASIC SLAG

by using it in the three **reinforced concrete** structures shown on this page—a ten-family apartment house, a commodious Community House and a combination laundry and ice plant.

Other big cotton mills mindful of their employes' welfare have turned from frame to concrete construction for these real advantages—perfect sanitation, freedom from vermin and fire, freedom from repairs and replacements.



Excerpts from report of City Building Inspector

"Test on floor on 10-family simplex house for Avondale Mills, Birmingham:

"The floor test is 16' x 14' clear span, a 4" finish slab with 26 gauge Hy-Rib reinforcement: 170 lbs. total dead and live load remained on floor 24 hours. The deflection at end of loading one slab was 3/64" and the other 1/32". Upon load being removed the floor moved up to its original position.

J. E. SPENCER,
City Bldg. Inspr.,
Birmingham, Ala.

Details of these substantial enlargements just completed for Avondale Mills will be mailed to interested executives.

Owners of Avondale Mills have in recent years used thousands of tons of **Ensley Basic Slag** in the construction of permanent buildings, houses, streets and roads at Birmingham, Sylacauga and other points.

Birmingham Slag Co., April 12, 1920.
Birmingham, Ala.

Gentlemen:

The enclosed report from City Building Inspector covers his test on a concrete slab in Apartment Job for Avondale Mills.

The mixture used was 1:2:4, the aggregate being Ensley Basic Slag. We give considerable credit for the splendid showing made to the use of the aggregate which has certainly proved beyond doubt its adaptability to our system of reinforced concrete construction without the use of forms. Yours very truly,

Donaldson Concrete Construction Co.

BIRMINGHAM SLAG COMPANY

Branch Sales Office
84 Marietta St.,
ATLANTA, GA.

Home Office: Jefferson County Bank Building
Birmingham, Alabama

Branch Sales Office
Williams Bldg.,
THOMASVILLE, GA.

THE FUNCTIONS OF THE ENGINEER

I—His Relation to Industry

There are three basic divisions of business activities:

1. *Production activities.*
2. *Distribution activities.*
3. *Activities to reduce expenditure of effort and facilitate the operations of production and distribution.*

These three phases of business operations are interdependent. Without the activities of the third, profit could not be written on the right side of the ledger, production could not be purged of wasteful effort and the expense of distribution could not be brought down to the requisite level for the economic needs of commerce.

Into this third division falls the major part of the work of the engineer—a work of incalculable value to industry.

His plans, designs and constructions; his selection of locations, materials and methods have made possible greater production and quicker distribution—frequently of so extensive a character that his fee has withered into an insignificant item of cost, when compared with the economies which have resulted from his counsel and efforts.

The net profit on the investment for the counsel and services of a competent engineering organization is too great to be overlooked by the concern that is planning a new factory, mill or power plant or extensions or alterations. On the correct engineering plans and development will hinge the possibilities for years of profitable operation as well as for economy in construction.

J. E. SIRRINE and COMPANY

Engineers

GREENVILLE
SOUTH CAROLINA

331 MADISON AVE.
NEW YORK CITY

"RIVERS IN HARNESS"—of interest to those who are considering the development of hydro-electric power sites.

"PICKS TO THE MINUTE"—for the textile manufacturer who contemplates erection of new mills or additions or improvements to old mills.

"CONTENTMENT UNDER ROOF"—some facts on the construction economies and production factors of industrial housing.

"FACTORIES FOR THE FUTURE"—on building a plant so that it may grow with the business without depreciating efficiency.

Write for those that are of interest to you

John W. Ferguson Co.

ORGANIZATION IN BUILDING

MODERN construction service demands more than mere effort. It requires the co-ordination of men and materials; the linking up of technical skill with those administrative qualities which are essential to the execution of modern contracts. It calls for organization, in all that that word implies.

From the day the first sod is turned, to the conclusion of the contract, when a broom-clean building is delivered to its owner, it is the Ferguson Organization which is responsible for the smooth, uninterrupted flow of material and effort. Experience —the fruit of 28 years of building—works hand in hand with a genuine desire to serve, a pride in honest work well done.

Such is the characteristic, the type of organization, the class of service rendered by the John W. Ferguson Company that, once its acquaintance is made, leads clients to employ it again and again, as often as they have need of new buildings or seek repairs to old.

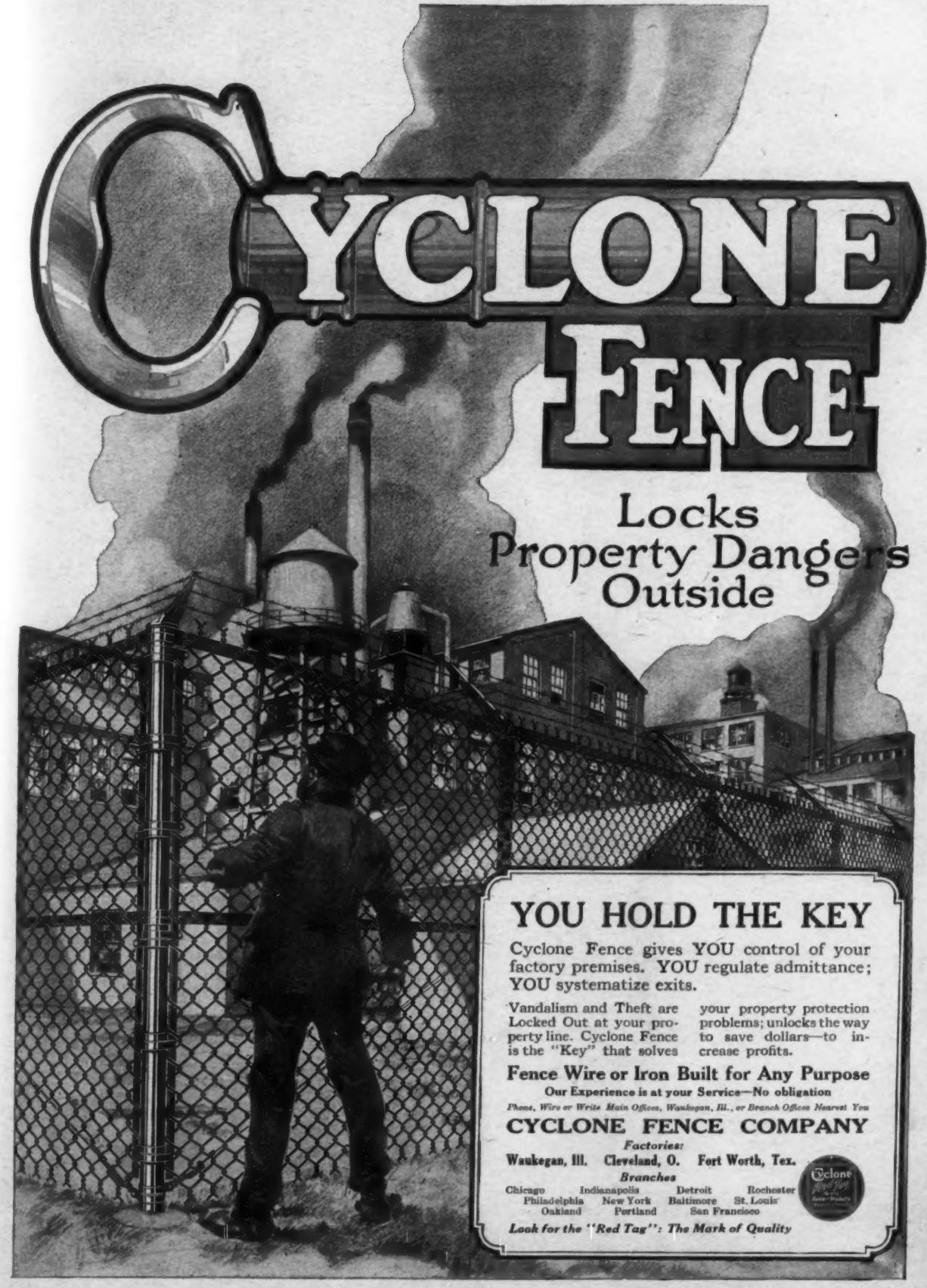
65-103

Paterson, N. J. · · · New York, N. Y.

Among the many who know the worth of Ferguson service are:

B. T. Babbitt
Columbian Rope Co.
H. W. Johns-Manville Co.
Pennsylvania R. R. Co.
Singer Manufacturing Co.
Worthington Pump and Machinery Corp.

JOHN W. FERGUSON CO.
Built for
KLOTZ THROWING CO. CARBONDALE PA.



YOU HOLD THE KEY

Cyclone Fence gives YOU control of your factory premises. YOU regulate admittance; YOU systematize exits.

Vandalism and Theft are Locked Out at your property line. Cyclone Fence is the "Key" that solves your property protection problems; unlocks the way to save dollars—to increase profits.

Fence Wire or Iron Built for Any Purpose

Our Experience is at your Service—No obligation

Phone, Wire or Write Main Offices, Waukegan, Ill., or Branch Offices Nearest You

CYCLONE FENCE COMPANY

Factories:

Waukegan, Ill. Cleveland, O. Fort Worth, Tex.

Branches

Chicago Indianapolis Detroit Rochester
Philadelphia New York Baltimore St. Louis
Oakland Portland San Francisco

Look for the "Red Tag": The Mark of Quality

The Favorite Flooring for Modern Textile Mills,
(—and Some of the Good Reasons.)

TUPELO

"Tupelo works easy and wears hard." *Most Economical Flooring for Textile Mills*

"WELL, THERE'S SOMETHING IN THAT."

TUPELO
("THE HARD-WEAR")
LUMBER

It is peculiarly valuable for TEXTILE MILL FLOORS, because, although it is a soft wood and therefore easily worked and laid, it has what scientists call an "involved" grain. This is a grain in which the fibres are "knitted" or "woven" together and results in extreme resistance to friction such as a floor has to withstand. TUPELO FLOORING DOES NOT TEND TO SPLINTER OR SLIVER. ("There's something in that.") This tough, wear-resisting characteristic of TUPELO is so great that this wood is largely used for FLOORING IN WAREHOUSES and for PLATFORMS WHERE HEAVY TRUCKING IS DONE. There is no harder test for a floor than that.

YOU WILL FIND IT ***WORTH WHILE*** *TO KNOW ALL ABOUT* ***TUPELO*** *BEFORE YOU PLACE YOUR ORDER FOR* ***FLOORING***

Ask us for Full Information about this valuable, dependable and, in the best sense, economical wood. Please address nearest office.

Southern Cypress Mfrs.' Association

805 HIBERNIA BANK BLDG., NEW ORLEANS, LA., or 805 HEARD NATIONAL BANK BLDG., JACKSONVILLE, FLA.

Light Where Light Is Needed

A MILL for weaving canvas goods—tents, awnings and sail cloth. Big floor areas needed, with light rather than ventilation the main problem.

The building measures 224x331 feet. The central portion is two stories high, with a sawtooth roof. Around all four sides a third story is raised.

Where light is essential it is ample. Yet sufficient space is provided on the first floor for storage without needless cost.

Lupton Pivoted Factory Sash is used for all windows; Pond Continuous Sash for the sawtooth roof.

Catalogue 10-LSS gives standard sizes and full information about Lupton Factory Sash; Catalogue 10-PCS about Pond Continuous Sash.

DAVID LUPTON'S SONS COMPANY

Amber St. and Allegheny Ave. Philadelphia, Pa.

Specialists in Daylighting and Ventilating Equipment for Maximum Production

Chicago New York Buffalo Cleveland
Detroit Pittsburgh Atlanta Boston

Canadian Manufacturers: The A. B. Ormsby Co., Ltd., Toronto

"Today —— the Sash makes the Factory"

Lupton
INVESTMENT VALUE

Lupton Pivoted Factory Sash—Cat. 10-LSS

Lupton Counterbalanced Sash—Cat. 10-LCB

Lupton Steel Partitions and Doors—Cat. 10-LSP

Lupton Rolled Steel Skylight—Cat. 10-Misc.

Pond Continuous Sash, for Pond Truss roofs, monitors, sawtooths, and side walls—Cat. 10-PCS

Pond Operating Device for long lines of sash—Cat. 10-PCS

Keeping Up-Keep Down

BUSINESS executives of mills are realizing more than ever the importance of systematic up-keep of buildings and mill equipment.

The liberal use of paints, their careful selection as to quality and purpose, are prime factors in the economical up-keep of your property.

Varnishes—Stains—Enamels

are the results of more than fifty years experience and research to meet the requirements of mills.

Each Pee Gee Product is made for a specific purpose and will give you longest service at lowest possible cost.

A protecting coat of Pee Gee Paint or Varnish will insure your buildings and machinery against decay and keep down the cost of up-keep.

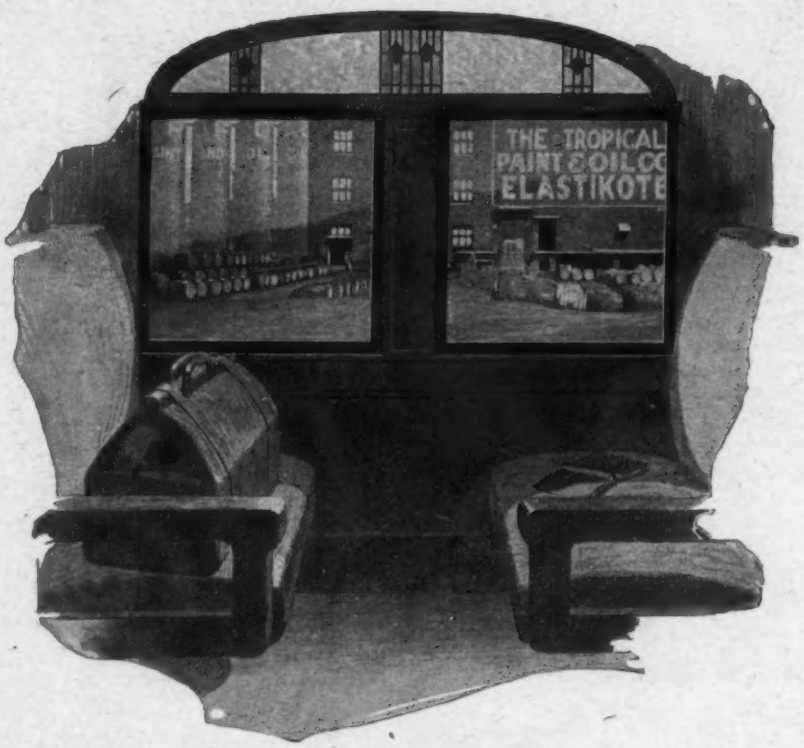
Write today for Booklet on "Pee Gee Industrial Paints."

Peaslee-Gaulbert Company, Inc.

PAINT GRINDERS—VARNISH MAKERS

Established 1867 **LOUISVILLE, KY.**

What Sort of an Impression is Made on the Minds of the People who Pass Your Plant?



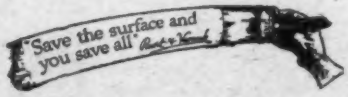
Railroads, street cars and automobiles carry thousands of people past manufacturing plants every day in the year. If the buildings are well painted and in good repair, those who see them get the impression that the products manufactured within must be good. A dilapidated looking plant gives the opposite impression.

If your buildings need repainting it will be good advertising to brighten them up with

ELASTIKOTE

This is a paint designed especially for use on wood, brick or metal buildings in manufacturing districts. It is different from other paints, because it is made from an elastic gum base instead of a lead and zinc base. This elastic gum is not affected by smoke, gases, moisture or severe weather conditions and imparts these same qualities to the Elastikote. Lead and Zinc Paints are not so satisfactory in manufacturing districts, because they soon darken and disintegrate.

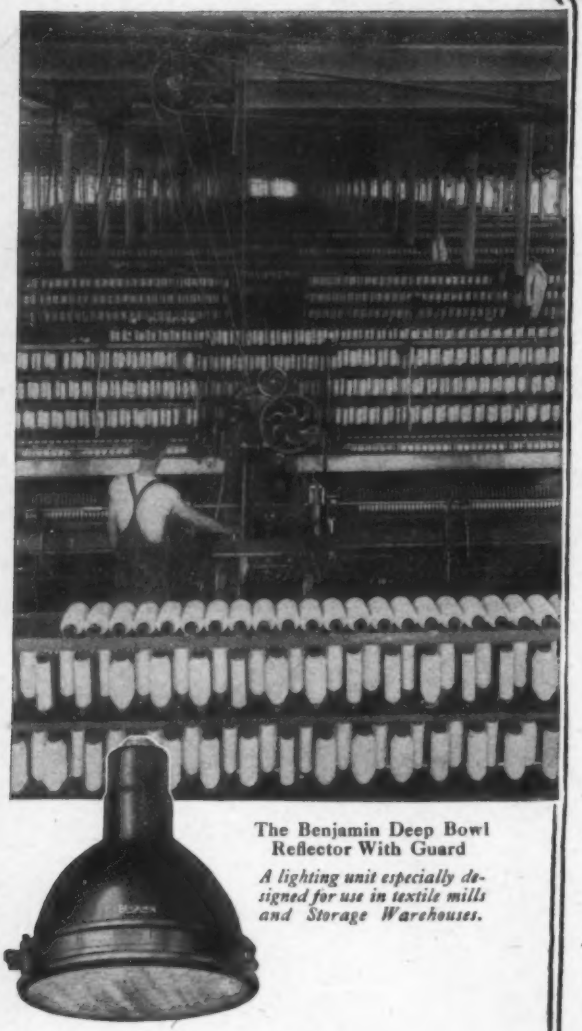
Elastikote has been used for many years by some of the most prominent manufacturing concerns in the country—a list of these users will be sent upon request together with a color card and complete information about Elastikote.



The Tropical Paint & Oil Co.

CLEVELAND, OHIO

Specialists in the Manufacture of Protective and Decorative Coatings for Industrial Plants.



The Benjamin Deep Bowl Reflector With Guard

A lighting unit especially designed for use in textile mills and Storage Warehouses.

Combine SAFETY With Correct Light Distribution

Any matter involving safety is worthy of the deepest consideration. Too often a danger that may be regarded as remote in possibility is disregarded until it becomes a terrible actuality.

In the Benjamin Deep Bowl Reflector with Glass Guard we have forestalled the possibility of lint particles or other inflammable material coming in contact with the hot surface of a high intensity lamp.

This fixture shown is a combination of special wire glass guard and a 9-inch Benjamin Deep Bowl Reflector. It prevents damage to the lamp from without. If the lamp should break from other causes the guard prevents pieces of glass from falling down into the work, while if the guard becomes damaged the wire mesh will hold the broken pieces in place.

Wherever inflammable or delicate materials are being made or stored, protection like that afforded by the Benjamin Lighting Unit X6168G is an indispensable factor of safety.

For details write, the Advertising Department 806 W. Washington Blvd., Chicago

BENJAMIN ELECTRIC MFG. CO.

Factories: Chicago and Desplaines, Ill.

Sales and Distribution Offices:

247 W. 17th St., New York 806 W. Washington Blvd., Chicago
560-562 Howard St., San Francisco
Benjamin Electric Mfg. Co. of Canada, Ltd.
Toronto, Canada
The Benjamin Electric, Limited
London, England

BENJAMIN PRODUCTS

The following are divisions of Benjamin products on which we will be glad to send information:

Industrial Lighting Division
Electrical Division (including Benjamin Two-Way Plug)
Pressed Steel Products Division
Enameled Products Division
Starrett Panel Board Division

BENJAMIN

Makers of Things More Useful

CONDULETS

Condulet the Job

"Here's the Condulet We Should Use"

WHEN faced with the responsibility of deciding the proper safeguard, consult the Crouse-Hinds catalog which is a sure way to reach the correct decision.

This is true in all classes of electrical installations — large or small — wherever there is a conduit outlet.

Have you this catalog at hand? It is available upon request.

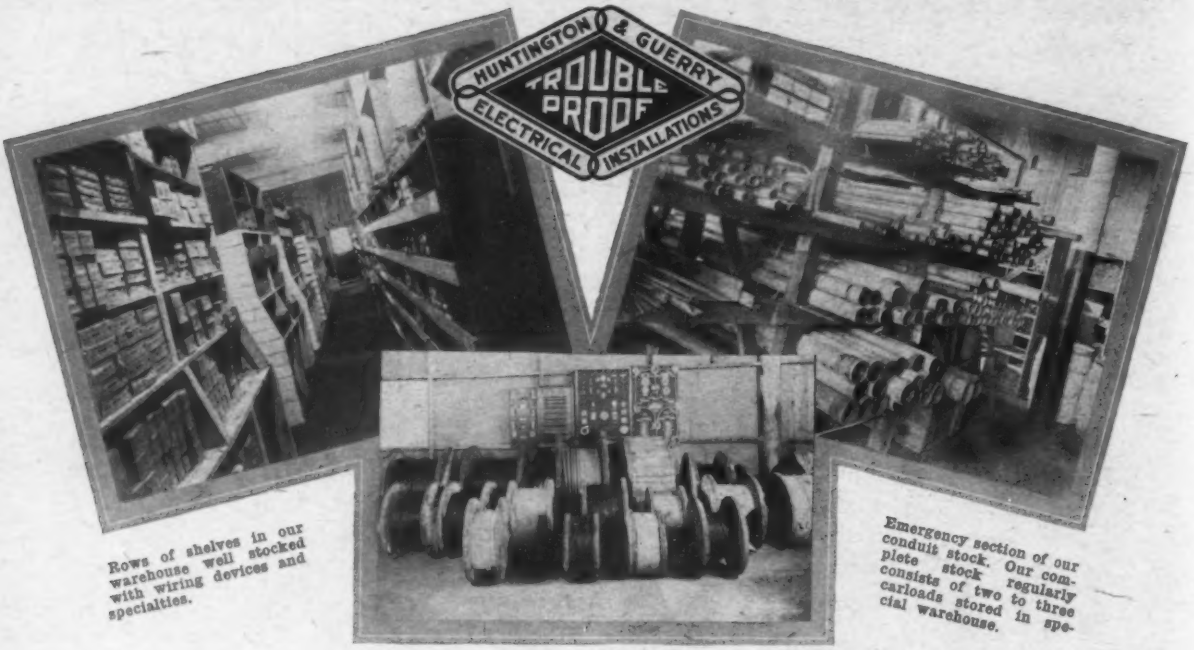
CROUSE-HINDS COMPANY
SYRACUSE, N. Y.

Panel Boards — Knife Switches
Guy Anchors — Condulets
Flood Lights

THE MK SERIES

Door over the fuse compartment cannot be opened when the switch is in the "on" position.

CROUSE-HINDS



Rows of shelves in our warehouse well stocked with wiring devices and specialties.

Portion of our stock of wires and cables to show variety of size and types carried. Our complete stock regularly consists of 12 to 15 tons.

Emergency section of our conduit stock. Our complete stock regularly consists of two to three carloads stored in special warehouse.

AT YOUR SERVICE

A regular stock of materials large enough to wire one or two cotton mills of average size.

Two to Three Carloads of Conduit

Twelve to Fifteen Tons of Wire and Cable

All Kinds of Wiring Devices and Accessories to Match

We maintain this stock exclusively to give our customers prompt service on wiring installations—not for general sale.

You know what this means in these days of slow deliveries and curtailed production.

YOURS FOR SERVICE

HUNTINGTON & GUERRY, Inc.

GREENVILLE - SOUTH CAROLINA

The Macey Company, Grand Rapids, Michigan.

An Unusual Photograph of an ABolite Installation

The above is truly a remarkable photograph of a lighting installation. It is unretouched and shows clearly the uniform distribution of light possible with the use of ABolite Reflectors.

Notice the absence of sharp shadows, the absence of contrasty high lights and shadows on the working plane, and the general pleasing appearance of the room.

Let Adams-Bagnall engineers plan a lighting layout for your plant.

Write for Catalog No. 175

ADAMS-BAGNALL ELECTRIC CO.

CLEVELAND

Chicago—29 E. Madison St.

Manufacturers of

ABOLITE REFLECTORS—Four types of reflectors: RLM, Shallow Dome, Deep Bowl and Angle Bowl—furnished interchangeable with three types of one-piece neck construction—for Industrial Plants, Sign Illumination, Show Windows, Roadways, Sidewalks, Yardways, Garages, etc.

SMALL MOTORS—GYROFANS.

ADAMS-BAGNALL

"Say Chief, This is as easy as reading a thermometer."

"WHAT'S THAT SAM?"

"The Westinghouse Foot-Candle Meter."

"What's a Foot-Candle Meter?"

"Just this. When the Westinghouse Engineer installed those large Mazda C Lamps, he showed me that to keep up production to standard we should always have eight foot-candles on the working plane. This device tells me at a glance whether I'm getting the right amount of illumination in the same way a steam-gauge tells me the amount of pressure we're carrying."

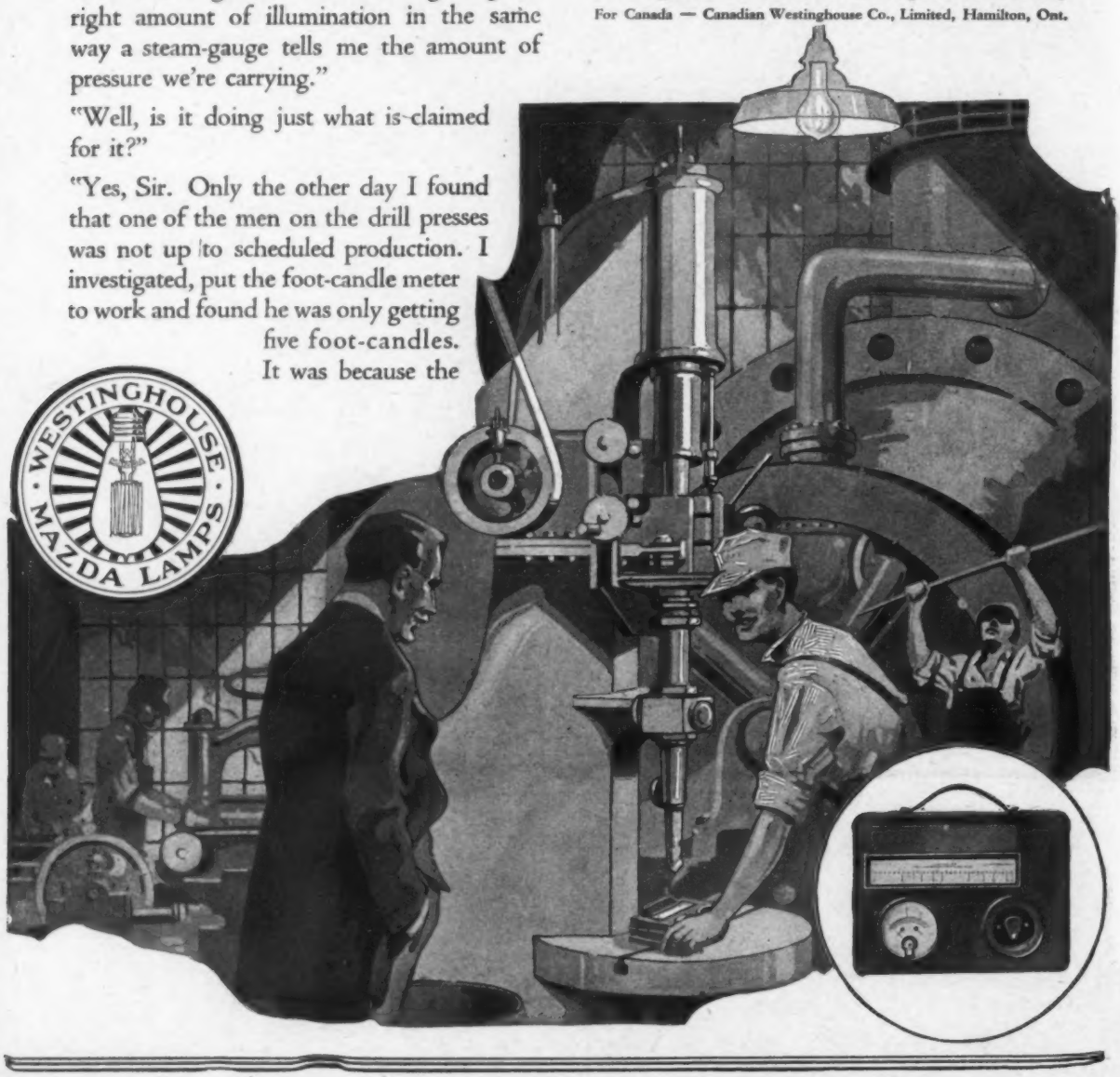
"Well, is it doing just what is claimed for it?"

"Yes, Sir. Only the other day I found that one of the men on the drill presses was not up to scheduled production. I investigated, put the foot-candle meter to work and found he was only getting five foot-candles. It was because the porter was too lazy to clean off the reflector and lamp."

"You know Sam, I've often felt the need for such an instrument and I'm sure other manufacturers would be glad to know about it."

"Well, let them learn as I did by writing the

WESTINGHOUSE LAMP COMPANY
165 BROADWAY NEW YORK CITY
Sales Offices and Warehouses Throughout the Country
For Canada — Canadian Westinghouse Co., Limited, Hamilton, Ont.



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MIDLAND BLUE R

An Indigo derivative destined to replace Indigo to a large extent.
Brighter in shade and faster to light, washing and bleaching than Indigo.
Has greater ability to penetrate the fibre. Suitable for dyeing raw stocks.

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Service to Lamps

Electricity may be dangerous or useful, a menace or a boon, according to how it is used! In exactly the same way, electric *light* may be either a destroyer of vision or the greatest possible *aid* to vision that a workman can have.

Whether you get helpful light or destructive light does not depend so much on the kind of lamps you buy as on whether or not you "serve" those lamps properly with shades and reflectors. IVANHOE shades and reflectors are so accurately designed that they will *always* improve the quality of illumination secured. But to get the greatest possible improvement the lamps and reflectors should be expertly installed. We shall be glad to advise with you about getting this expert service from some one near you or from our own engineering organization.

IVANHOE-REGENT WORKS of General Electric Co.
Cleveland, Ohio

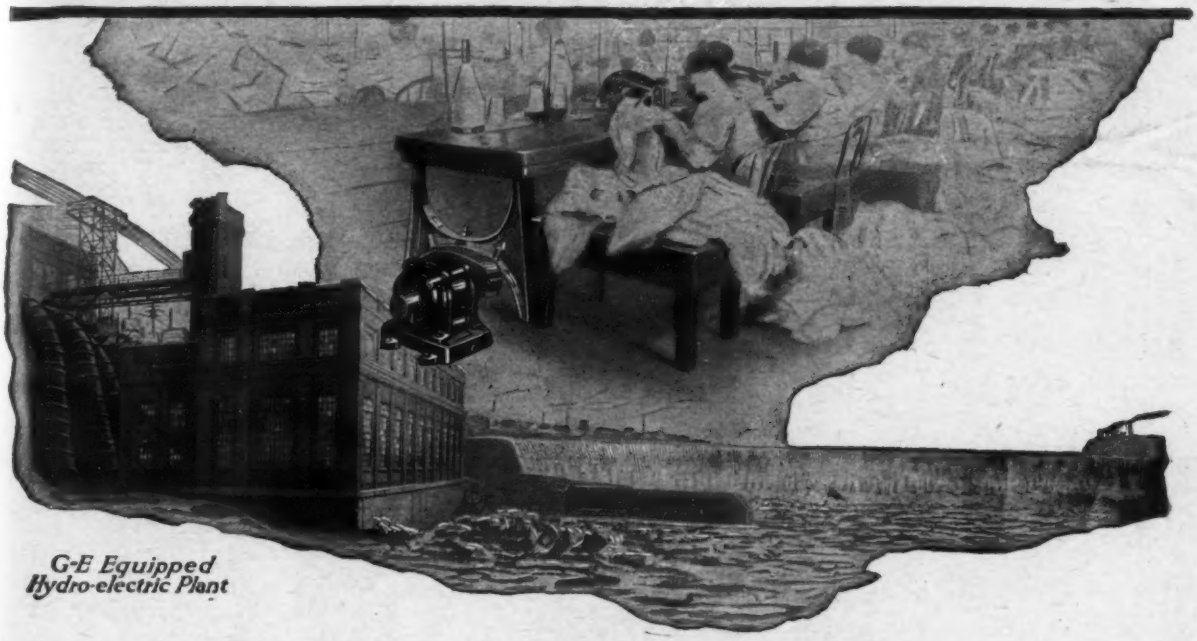
"Ivanhoe" Steel Reflectors, Lighting Glassware, Anderson Self-Adjusting Arms, and Illuminating Service.

"Service to Lamps"

IVANHOE

SHADES-REFLECTORS

In many cities production can be increased, its quality improved, and new industries added by efficiently making and using the available power



G-E Equipped Hydro-electric Plant

How electricity increased and improved a textile city's production

EACH mill in a certain textile city was driven by its old water-wheel—production was low, so was quality.

In summer, low water and leaky canal beds slowed up the wheels—in winter, anchor ice did the same.

Finally, G-E textile mill specialists were called in to suggest a better way of using the water power.

A central water power plant was built to supply all mills with electric power and provide a surplus for new industries.

Electric drives at each mill applied power directly to productive machines, and losses due to mechanical drives were largely eliminated.

Machinery was enabled to operate at a constant maximum productive speed.

Its output was increased 35% and a very much better product resulted.

Any community's efficiency may be increased manifold by the proper utilization of Nature's resources and the application of electricity in homes, industries or on farms.

Look for this mark of leadership in electrical development and manufacture

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

MILL POWER DEPARTMENT, BOSTON, MASS.

G-E motors

From the Mightiest to the Tiniest 44-98

GENERAL ELECTRIC COMPANY

$500.00 Saved Monthly In Boiler Labor Alone—

AFTER operating a Permutit Water Softening and Filtering System for one and three-quarter years, a Light & Power Company in Illinois reported the following:

We have no scale in boilers or pipe lines.

Our saving in coal is quite material—the saving over former conditions is easily 30%.

We formerly had two men drilling boiler tubes all the time, and now have none.

Our saving in boiler labor is easily $500.00 per month.

Zerowater appears just the thing for condensers.

It will pay you to investigate the system that is saving 30% fuel and $500.00 monthly in labor for others. Ask us for more facts—other testimony. Write us today. No obligations.

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440 Fourth Ave. New York
Offices in all principal cities

85

Red Vulcanized Fibre Re-Enforced Shuttles.

A Shambow Shuttle, thus reenforced, will outwear the best plain wooden shuttle two to one and increase loom production and maintain, if not actually improve, quality. They will prevent an end an hour per loom from going down. Figure this out in additional loom hours added to your present producing capacity. More information cheerfully given, if you'll write.

Shambow Shuttle Co.
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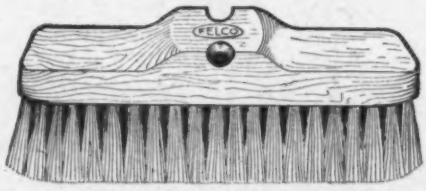

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FELCO FLOOR SWEEPS

are made to last. Your broom expense will be practically eliminated, for Felco Sweeps outwear a dozen brooms.

Made in any width for any purpose.

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Curved Floor Sweep for Spinning Room Alleys.

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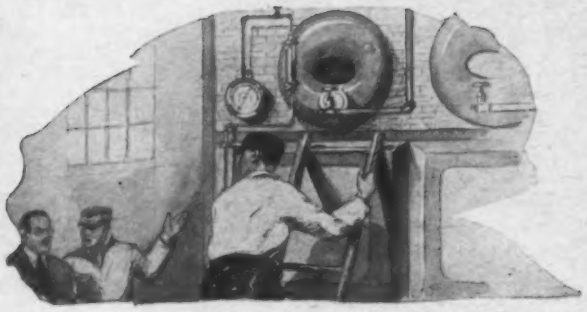

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PIONEER BOILER GRAPHITE

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"This particular flake graphite lessens the grip of the scale, and each application is a stronger prevention against new scale baking solidly to the metal.

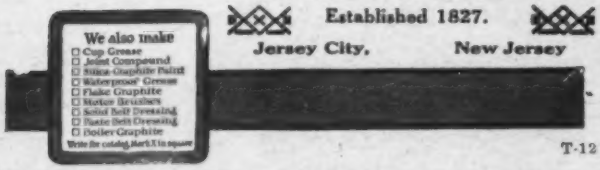
"I'm mighty glad I got the booklet, 'Graphite for the Boiler.'"

Have YOU that booklet? It's Booklet No. 34-T and will be sent free on your request. Write for it today.

Joseph Dixon Crucible Co.

Established 1827.

Jersey City, New Jersey



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Goods That Bear a Trade Mark Say: "Have Faith in Me."

Put a trade-mark on your goods and it is the same as telling your customers: "Here, we're proud of the goods we sell. Its quality is high. It is worthy of our name. Every time you see this trade-mark you can depend upon it, the goods are up to standard."

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With the Publishers

The Nurse In Industry

On any given day, three people in every hundred are ill, two of them seriously enough so that they are unable to work. Wage earners in the United States lose six hundred million dollars in pay annually because of sickness.

Excluding all humanitarian considerations, the employment of an industrial nurse can be abundantly justified on purely economic grounds. One company reports that the employment of a nurse reduced the cost of its accident insurance from $2.00 per $100 of the payroll to 10 cents per $100.

There are records of nurses being employed by the Vermont Marble Company in 1895, and by department stores in 1898. The statement that the Vermont Marble Company nurse was the first industrial nurse in this country has, we believe, never yet been challenged.

Florence Swift Wright, author of "Industrial Nursing" (MacMillan Company), and a pioneer nurse in industry in the United States, contributes an article to this number of COTTON.

FLORENCE SWIFT WRIGHT.

Miss Wright is a graduate of the New York Hospital and has made a special study of social and industrial conditions. She has done industrial nursing in mercantile and textile establishments for many years, and is familiar with all the various phases of this interesting field of work for educated women. Miss Wright says that the industrial nurse should be a woman with a sense of humor, and a knowledge of industry as well as a thorough knowledge of all branches of public health work.

At the annual convention of the National Organization for Public Health Nursing, which was held in Atlanta last April, a special section for industrial nursing was formed and Miss Wright was unanimously elected chairman.

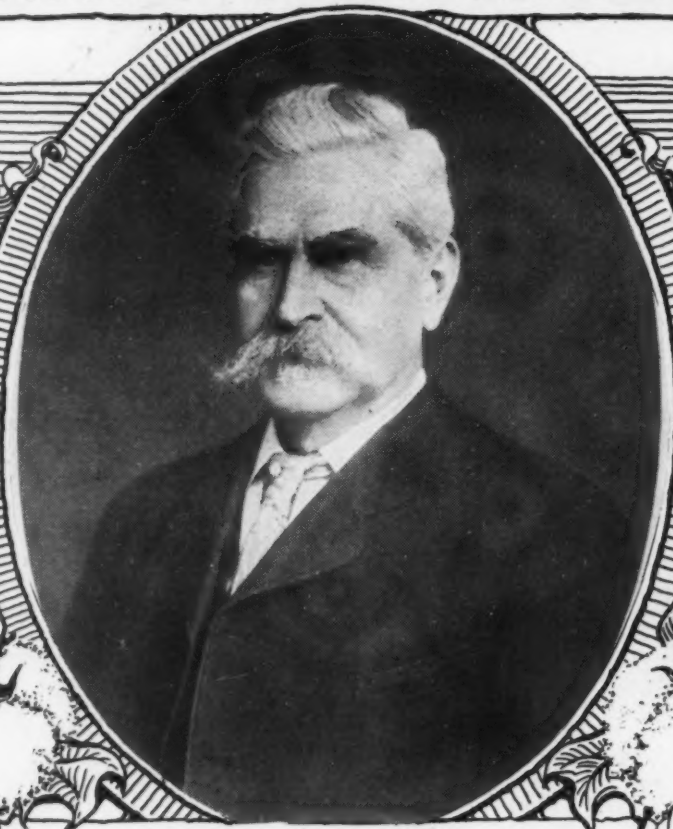
Take The Question of Spindles

It has long been understood that there were certain limitations to the speed at which plain bearing spindles might be run. Because of these limitations and in an effort to extend them, as well as to greatly reduce the horsepower required in spindle operation, a number of ball bearing spindles have been designed and in some instances placed upon the market. In order that COTTON'S readers may pass on the practicability of such spindles, its editors are presenting in this issue an article on "Ball Bearing Spindles" in which is combined the available information on their development and design.

The author of this article, Theodore M. Prudden, is a graduate of Sheffield School, Yale University, in mechanical engineering. He was employed for several years in general manufacturing engineering by the Oakville Co. of Waterbury, Conn., makers of sheet metal and wire goods. From there he went with the Chapman Manufacturing Co., makers of ball bearing spindles, as assistant superintendent and later as traveling salesman. With the General Electric Co. of Lynn, Mass., where he was next employed, he worked in the cost department. From there he was called into the army as First Lieutenant of Ordnance and served in that capacity nearly two years, both at Frankford Arsenal and overseas. Mr. Prudden is now employed by the Whitin Machine Works, builders of textile machinery, as a mechanical engineer.

Mr. Prudden's experience with ball bearing spindles includes a first-hand knowledge of the problems of commercial manufacture, of costs, of the wants and attitude of the buyers of ball bearing spindles and a knowledge of the best practices in the making of sliding bearing spindles.

AMONG COTTON'S READERS



G. Gunby Jordan

President, Third National Bank, Columbus, Georgia
On the Directorate of the Eagle & Phenix Mills and Several Other Large Textile Organizations

"There are a few journals devoted to specialties that I always find not only entertaining but educational. Having confidence in the facts and figures that I see in COTTON, have always read it with great satisfaction."

G. Gunby Jordan

July, Nineteen-Twenty

Industrial Lighting and Work Efficiency.

The immediate results of proper industrial lighting may be classified under three principal heads—health, safety and efficiency. The close relation between light and health has long been recognized. It has been found by experience that operatives work more cheerfully in a well lighted mill; more attention is paid to personal and plant cleanliness and the general morale is better.

Particularly in textile plants, poor illumination enormously increases the effort of doing good work, and this strain shows itself in the form of headaches, eyestrain and general lassitude. When we add to the normal strain of exacting work the inability to see that work clearly and in comfort, we are imposing a handicap to even the best and most experienced of employees.

On the question of safety, the proper illumination of a plant plays an important part; and it matters not whether the illumination be natural or artificial. A careful survey of industrial accidents and the accompanying lighting conditions is allowing the mill manager with an investigative mind an opportunity to make the necessary corrections in his plant and bring his accident ratio from this cause down to the minimum. The establishing of Safety Committees in textile mills is also greatly aiding in this work and, to a certain extent, relieves the manager of a portion of his responsibility. However, it is imperative that the recommendations of the Safety Committee be given careful attention and, within reason, immediate adoption, otherwise the burden still rests with the managing executive.

The economic effect of inadequate lighting on output is not always so easy to indicate, but it is evident that it increases the difficulty of supervision and to a certain extent excuses a worker for bad work or seconds. A skillful worker is undoubtedly handicapped if it is impossible to clearly see the work and in these days of high labor, material and machinery costs, the lack of suitable lighting arrangements is an absolute waste of money. Very naturally these remarks apply particularly to the older mills, as those of more modern construction have received careful attention at the hands of the mill engineers. In a series of experiments conducted by the Commonwealth Edison Company of Chicago in ninety-three different factories a variety of conditions were found. From the results obtained a conservative average estimate was made and it was concluded that an increased cost of lighting amounting to not more than five per cent of the pay roll would lead to an increased production of quite fifteen per cent. Of course this applies to artificial lighting only. The question of improved natural lighting, while more difficult of application in old mills, is one that should not be overlooked. A careful consideration of the subject by competent engineers frequently points the way to improved production and increased profits.

The Transportation Problem.

In these days of "outlaw strikes" on the part of those whom one politician designated as "my boys;" with one big experiment in Government ownership or management in retrospect and the unscrambling of the scrambled railroads in progress; with embargoes, car shortages and damaged locomotives; with coal and steel strikes (whether "outlaw" or otherwise) to aid in the disorganization; and with the great increase in all business because of the suspension of domestic progress during the war period, the transportation problem has become one of the vital questions of the country. The final solution of this question will take much time and money, careful thought and some educational work, but it has a practical side on which everyone can do something to help the situation. Such help may be only temporary, but it is timely actions that count most in crises.

Suggestions on this question from the viewpoint of a traffic manager have been prepared by E. A. McCarthy of the Hyatt Roller Bearing Company, Chicago. Mr. McCarthy says:

"During the past winter I have seen office men of mediocre physique spend night after night in various railroad switching yards out in the snow and rain to make sure that their shipments were moved. I have seen these same men roll up their sleeves alongside freight handlers and help transfer stuff from one car to another. I have seen farm tractors do switching work day after day—switching that technically was the duty of the railroads. I have known manufacturers to send men across several states to get a trunk or a suit case full of parts to be used for completing machines—machines that were often sold at a loss.

"One Michigan manufacturer, within the next few weeks, will begin operating a fleet of trucks between his factory and his sources of supply—in some instances a distance of over 700 miles!

"In our own organization every man who has visited our factory during the past six months has been instructed to bring back as many bearings as he could carry as baggage.

"During the express handlers' strike over half of our office force went down into the railroad yards and spent day after day—sometimes far into the night, unloading express cars containing our product in order to expedite deliveries to our customers.

"It is hard for the public to realize just how many difficulties have beset the manufacturer in making deliveries during the past two years. Never before have so many different obstacles had to be overcome. Although on every hand we hear cries of greater production, I believe that a thorough analysis would convince anyone that it is more a question of transportation, for even with disturbed labor conditions the majority of delays in manufacturing can be traced directly or indirectly to delays in transporting material.

"During the past three years transportation has been the 'neck of the bottle.' No one has been free from the effects. The manufacturer has been delayed in getting his material. He is dependent upon the steel mills and the parts makers and they in turn are dependent upon the mines and then again the mines are dependent on other manufacturers for mining equipment with which to operate.

"The farmer is dependent on many phases of the manufacturing industry to supply his needs and absolutely everyone is directly dependent upon the farmer.

"Thus we get an endless circle of dependencies and analyzing the situation from its various angles the wonder is that things are moving along as smoothly as they are.

"Since 1915 the volume of freight handled in this country has increased 45 percent. During the same period the increase in number of freight cars amounts to only 2 percent!

"This deficiency in freight car equipment is seen reflected in express service; when a shipper realizes the congested freight condition he routes more and more of his goods by express.

"As a result of this condition express shipments have increased more rapidly than ever before. Few express cars have been built during the past three years. Today it is quite the practice to ship commodities by express that under normal conditions would have always gone by freight. This has been a substantial factor in increasing prices.

"The railroads are the arteries through which the very life blood of the nation flows. These arteries are hardened, they no longer expand, the blood pressure is high. Goods can not be freely transported from one section of the country to another and as a result of this our whole industrial system is out of joint.

"The only way to compensate for the deficiency is to speed the flow of products through the available channels. It is up to the traffic men—both with the railroads and with private corporations to accomplish this. It is their duty to judiciously apportion material and transportation equipment,—to protect both buyer and seller, to use every piece of equipment to the greatest possible advantage, to safeguard the public interests,—always observing the basic rule, 'the greatest good to the greatest number.'

"It is a 'man's size job.' It is an unending job. Conditions are serious—if we give up to them they will immediately become disastrous!

"More work, more thought and less talk are needed. High-brow legislation will not change the economic condition. The problem is practical rather than political. We have no time to spend in proving who is to blame. It's a question of making the best of things by putting forth constructive effort and real 'sweat.'

"Traffic men cannot remedy the situation single handed, Others must do their share. The dealer in farm machinery should have a clearer understanding of the problems that confront the manufacturer and the farmer should appreciate the dealer's efforts to supply his needs. The public as a whole should maintain a liberal minded attitude towards the railroads.

"Transportation is the neck of the bottle. Immediate individual profit is quite incidental. The big problem is to keep the wheels of industry turning. It is up to everyone to face the situation and consider things fairly. The problem affects everyone directly or indirectly. It's up to everyone to do his part toward alleviating the condition.

"Equipment should not be delayed. The fact that a man is willing or able to pay a high demurrage charge does not entitle him to hold up a freight car. Such a man is not only subjecting some other shipper to a hardship, but he is placing himself in a position where the railroads will not be inclined to give him preferred service the next time he needs a car. To needlessly detain equipment is a crime against the economic welfare of the nation. The man who is guilty of it is an enemy of society.

"Cars should be loaded to a maximum capacity, which generally speaking, is 10 percent above the rated capacity. In other words a car marked 60,000 pounds should be loaded to 66,000 pounds.

"Consignees should promptly take up L. C. L. shipments in order to avoid freight house congestions.

"Buyers of all kinds should anticipate their requirements as far ahead as possible.

"Idle talk will accomplish nothing. Intelligent cooperation and hard work will save the day."

A fire occurred recently in a picker room due to a spark from a broken electric light globe igniting finished laps. The loss was nearly $500. Suitable protective coverings or cages for lamp globes in rooms where loose cotton is handled would prevent accidents of this kind and $500 would equip quite a number of such rooms. It would seem as if the insurance inspectors had overlooked one valuable protective device.

Since the foregoing paragraph was written a report has been rendered of a fire in another picker room. An employee, who was removing a lap from a finisher picker, allowed the rod to break an electric light, the sparks from which ignited the lap. Fire spread to about ninety laps piled in the immediate vicinity. Two sprinklers operated and a chemical extinguisher was also used. The damage was confined to stock. Loss, $244.94.

Confidence the Keynote

BY "NORTH STATE."

The most valuable asset a manufacturer can have in maintaining harmony with his employees is their confidence; not so much confidence in him as their benefactor or friend, but confidence that he will do what he says he will do, that whether he grants their requests or refuses them, that he means what he says, and that he is neither bluffing nor deceiving them. He must play the game with all the cards on the table, and do away with all kinds of trickery and chicanery.

As long as the people have the feeling that the management is open and above board with them and that no deceit or double dealing has been practiced on them, you have the handle by which you can take hold of the most difficult situation; but when the people feel that every move of the management has a double significance and that every proposition made them has a joker attached to it, then you have a situation that will baffle the wisest of men.

During the last twelve months we have seen around us many interesting as well as distressing industrial disturbances. We have seen mill operatives who have been born and reared in the shadow of some old mill, nurtured by institutions financed by the mill company, who have in sickness and trouble looked to the company for help, and not in vain. Perhaps the parents of these people have worked at the same place and they are following in their footsteps, feeling that they are a part of this large industrial family; but also feeling that a part of the institution belongs to them. The machines they run they claim as theirs, and the mill house in which they live seems as much their home as if they had a deed for it. We have seen these very people changed, almost overnight, into bitter enemies of the institution which has been the chief dependence of their family for more than one generation. We have seen them reach the point where they said that all the executives of the plant were liars and could not be depended upon. We have seen the management learn to hate the sight of their former faithful employees and coworkers, considering them all "Bolsheviki" and embryo anarchists. And we have seen families, neighbors and friends divided among themselves; and former friends abuse and curse each other. Although we are passing through a period of unprecedented prosperity, it is also a period of unprecedented discontent and unhappiness.

It is my purpose to consider this proposition chiefly from the standpoint of the manufacturer. The first thing to remember is that the employees cannot be placed in a single class. There is always a considerable element of good conservative people who are working regularly, saving their money, who regret a shutdown of the plant as much or more than the management. This class, which is always present, is usually overlooked and accorded the same treatment as is shown the radical element, and are thus antagonized and forced against their will into the ranks of the radicals. It is of prime importance to remember not only to avoid antagonizing this element, but the good will of these conservatives should be cultivated, and this party developed and enlarged whenever possible. This can be done not by catering to the people in an ostentatious manner, but by following a policy of being absolutely fair but firm. Take no stand that cannot be defended; not that the management should go before the people to defend anything they do; but in these chaotic days, the people are watching the manufacturers, and any action of the management that can be defended from the standpoint of fairness and justice will be supported by the best people among the operatives. It is wise therefore to let the reason for any disciplinary action, or any movement of the management that might cause misunderstanding, to be clearly and fairly known by all the people. Under the conditions of the labor market at present, it is impossible (even if any one should desire to do so) to pursue a policy of "might makes right," "anything is right because the management says so" or "if you don't like it you can get out."

However, it will be found that the conservative element is logical and reasonable. They can see the necessity for discipline, organization and system, and will support it, and by maintaining the confidence of these people their assistance will be assured in controlling the radical party, which take the lead in all agitation. By an analysis of the personnel of any community, you will find that the conservatives are made up of the men and women who have families dependent on them, people who own their own houses, men with money in the bank, or, in other words, the people who by their thrift or by their circumstances are in a position to feel the responsibilities of citizenship.

The way to lose the confidence of all your people is to lose patience with them. To show by every little means you can that you have a feeling of animosity towards them. To refuse to meet and discuss the whys and wherefores of any situation with your people. To give them to understand that they have no right to reason, but that they should accept any actions of the mill as being beyond reproach. Of course there are enough trying situations nearly every day to exhaust the patience of the best manager; but it must be remembered that the employees also have been going though a trying and nerve-racking period. They have been mislead and mismanaged. They have been in doubt as to what was right and what was wrong; what was for their interests and what was against their interests. Frequently they would have turned to the management for leadership, but by some thoughtless act on the part of that management they were turned away. And then they have seen the tactics advocated by the radicals and the professional agitators seemingly win for them concessions they had never hoped to have; and finally it seems to them that the mere threat of trouble brings advanced wages and shorter hours. They have no way of knowing that many or all of these seeming concessions would have come to them naturally in the course of events without the trouble, expense, hatred and general unhappiness attendant upon a labor crisis.

Take into consideration now the conflicting emotions by which the people have been agitated, the unusual prosperity which has come to them as a bolt from a clear sky,

the tremendous amount of misleading and untrue propaganda which has been forced upon them, and the short-sighted policy of some manufacturers, and you will come to the conclusion that in the main the people have not acted altogether in an unreasonable way, nor in a way very much different from that in which any other average human being would have acted under similar circumstances. Also remember that after a year of almost constant agitation and disturbance the better element of the people are tired of such things and desire nothing more than days of peace, with an opportunity to work regularly and add to their growing savings; and that now is the time to cultivate confidence and good will and to get close to your people. Let them know by your actions that you want to be their friend, and that you too desire the return of peace and happiness; and you will be rewarded by the cooperation and confidence of the better element, which will be a bulwark of defense against future foolish and unnecessary disturbances.

Good Packing Helps to Defeat Thieves.

"Continuation of the apparently worldwide wave of pilferage from ocean shipments has led shippers of all classes of commodities to consider means of more completely protecting themselves, both by obtaining insurance which fully covers risk of theft, and at the same time by protecting their shipments with various means of packing. Not only are losses so serious that insurance rates are rising, while some companies have ceased to issue covers against pilferage risks, but frequently only part of the shipment is received, raising in the mind of the consignee the unfortunate suspicion of short-shipment.

"To cooperate with British marine underwriters in an effort to curb this evil, a committee of American insurers has been appointed to consider definite steps, and as the first measure of relief has decided to call on the New York State Chamber of Commerce and the various freight-handling organizations to aid in remedying the situation in the port of New York. It is hoped that this action will lead to similar interest elsewhere.

"Various means to lessen pilferage have been suggested, among them putting wooden battens around all edges of the case, using patent clinchers with locking nails, and lining cases with wire netting. From a leading exporter of leather comes the statement that leather manufacturers may form an insurance association of their own, perhaps reinsuring in other insurance companies, somewhat after the fashion of the tobacco interests. Leather has been especially subject to theft, and premium rates have been perhaps more frequently raised on it than on any other commodity.

"On this subject our manager at Rotterdam writes: 'We are struck by the large proportion and large amounts of claims on shoe shipments, particularly for pilferage. In the olden days, it used to be sufficient to pack for the purpose of safe transportation; at the present time, however, with the increasing thievishness of dock laborers, it is becoming necessary to pack, particularly shoes and similar small and valuable articles, with a view to protecting the contents of cases against attacks of well-armed laborers. In many cases the pilferages are doubtless committed in the holds of ships. It is an easy thing for a gang of men to drop a case from a stack a few yards high, and to burst it in such a way that the contents becomes visible and accessible to greedy hands."

The foregoing paragraphs are from the Foreign Trade Bulletin of the American Express Company and emphasize the need for good packing. While this emphasis is directed toward export shipments, the numerous complaints nearer home indicate that similar good packing is not out of place in the domestic field. "Good packing" and its twin brother "good marking" are money savers, time savers and productive of satisfied customers. They are an essential in modern business.

Fuel Oil Versus Coal.

A great deal of interest has been expressed in the question of fuel oil for power plant use during the past several months. This interest was intensified by the adoption of fuel oil in several New England mills and in at least one mill in the South. However, while oil fuel has many undoubted advantages as compared with coal, the unreliability of the Mexican fields and the present tendency of their big gushers to blow salt water after a comparatively short producing life, has taken away our largest source of what has heretofore been considered a permanent supply.

In discussing these changing conditions an oil expert recently said: "Under present conditions I would not advocate anybody changing their plant to oil. In fact, I would advise them to look seriously to change their plants where they are using oil to coal, and the sooner they do it the better, because unless they can get oil in large quantities from Texas, the marine and the navy will take all that away. We have no oil whatever from the oils that have a paraffin basis. All the fuel oil we can get has 30 percent of asphalt, and unless we can get four or five hundred thousand barrels a year from Texas we will not be able to get fuel oil in this country for use in steam boilers."

Once more we record a shingle roof fire. Sparks from the chimney set fire to the roof of a mill cottage at a southern mill, and while the mill brigade responded promptly to the alarm, the house was completely destroyed at an estimated loss of $1,050 before the fire could be extinguished. This sum would pay interest on quite an investment in fire resisting roofs.

A fire started in a cotton bin caused from a hot bearing.

A fire occurred caused by a hot bearing on one of the looms.

There was a fire in the twisting and weaving building due to a hot bearing on one of the machines.

A fire occurred in the card room caused by sparks from friction in the bearings igniting stock on the machine.

Stock on a machine in the picker house was ignited by a hot bearing on a machine.

From month to month the insurance reports indicate the need of applying ball or roller bearings to cotton mill equipment to prevent just such fires as are indicated by the foregoing.

Ball Bearing Spindles

BY THEODORE M. PRUDDEN.

In this article is combined the available information on the development and design of ball bearing spindles. It is intended to lay before manufacturers and mill men such facts as will enable them to pass on the practicability of the different spindles now being promoted or on the market.

Because they are not familiar with the laws governing ball bearings both users and builders of textile machinery often base their opinions on how a ball bearing will act in spindles on how plain bearings have acted in spindles. Moreover a man will accept as practical a 1" diameter ball bearing with ¼" balls running at 10,000 r. p. m. in an internal grinder but the same man may reject as impractical a ½" diameter ball bearing with ⅛" balls running at 10,000 r. p. m. in a spinning spindle. Yet the balls in the grinder and in the spindle revolve at exactly the same speed and if both ball bearings are equally well made, the smaller bearing will be just as practical for light loads as the larger bearing for heavier loads.

Regarding ball bearings, Machinery's Handbook says:

"Ball bearings are used in preference to sliding bearings principally for the following reasons. There is less loss of power on account of the lower coefficient of friction: the friction of a ball bearing is independent of the viscosity of the lubricant or its temperature; the frictional resistance at starting is very much less than in a sliding bearing; ball bearings are much shorter and more compact than sliding bearings; the scraping or fitting of bearing linings is not necessary; the danger of heated bearings is practically eliminated; a bearing of proper construction can adjust itself to deflection of the shaft; the wear is practically negligible."

Tests made on different ball bearing spindles which have at one time or another come on the market show the truth of these statements provided the bearings are well designed and made. The writer has at hand reports of tests made on ball bearing spinning spindles which show a saving of from 20 to 30 percent of the total power required to run a frame as compared with the plain bearing spindle.

The question arises that if these facts are so why haven't ball bearing spindles come into general use. It is because such spindles have not proved to be reliable or long-lived when they were made with ball bearings as an integral part of the design; and if a complete commercial ball bearing was used, such as is built by any of the well known ball bearing people, the cost has been so high as to make their introduction of questionable value. The latter is particularly true of spinning spindles where the cost of the commercial ball bearing alone is greater than the cost of the plain bearing spinning spindle complete.

To appreciate the claims for the different types of ball bearing spindles it would be well to consider the theory of and reasons for different kinds of ball bearing construction.

In the first place certain maxims are fundamental and must be kept in mind in judging designs of a ball bearing These maxims are:

1. The capacity of a ball bearing is directly proportional to the number of the balls.

2. The greater the speed of ball rotation the less the capacity of the bearing. Hence high speed bearings should have as large balls as possible and the diameter of the bearing should be as small as possible to insure slower ball rotation.

3. By using a grooved race the capacity of the bearing is increased and the coefficient of friction also increased slightly.

4. Races must be hardened and ground concentric within .0001" and curved races must be polished so that

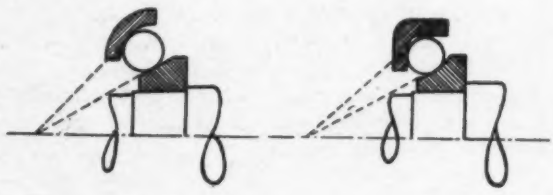


Fig. 1

Fig. 2

no roughness is visible with an ordinary magnifying glass. With flat races the ball, very quickly, makes its own polished track in service, true and correct.

5. Alignment, lubrication and cleanliness are essential to ensure long life. Good lubrication is absolutely necessary, not so much for the lubricating effect of the oil as for the prevention of rust on the balls and races which would quickly destroy the polished surfaces.

6. The balls and races must be uniformly hard and the balls of uniform diameter, so that each of the balls sustains its share of the load.

7. A good radial bearing can carry a thrust load of about one-tenth of its radial load capacity.

Ball bearings do not give out on account of wear but grind out by abrasion of the carrying surfaces. In fact, they do not wear. They may be ground out by admitting grit, but this is an abnormal condition for ball bearings as it is for sliding bearings. Ball bearings can be so overloaded that the strength of the bearing metal will be exceeded, particles of it will flake off, and the bearing ground out. Similarily any roughening of the races whether left there by the makers or caused by rust or by acid in the oil etching the races will result in a short lived bearing.

Angular load bearings are probably familiar to most of the readers of this article. They are adjustable and are the type found in bicycles and in the front wheels of Ford cars. Regarding them Mr. Henry Hess of the Hess-Bright Ball Bearing Co., has said, "The shapes and modifications of angular load bearings are innumerable. Figures 1 and 2 may be taken as typical instances of these bearings representing two and three point contacts. In order to secure rolling contact, the contact points of the balls on the races should be points on a cone of rotation

whose apex lies in the center line of the shaft. The defect in all these forms of bearings is their adjustable feature. This places them absolutely at the mercy of everyone capable of handling a wrench. A bearing properly proportioned with reference to a certain load may be enormously overloaded by little extra effort applied to the wrench, or on the other hand the bearing may be adjusted with too little pressure so that the balls will rattle and the results consequently be unsatisfactory. The prevalent idea that angular ball bearings can be adjusted to compensate for wear is erroneous." A further objection to the three point contact bearing (Fig. 2) is the difficulty in grinding the outer race so that the two points of contact will lie on the cone of rotation.

The weakness of the adjustable feature in angular load bearings has led to the development of the type where the balls and races are assembled in one complete unit. This is the type which is referred to in this paper as the "commercial type" of ball bearing. Such bearings generally have a separator which keeps the balls apart and which the usual method of assembly makes necessary. The assembly is accomplished by arranging the races as shown in Figures 3 and 4, and after placing in the crescent shaped space "A" as many balls as can be freely dropped in, the inner race is shifted leaving an annular space with the

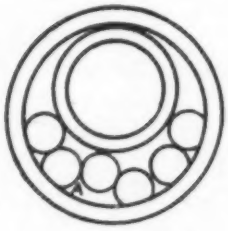


FIG. 3

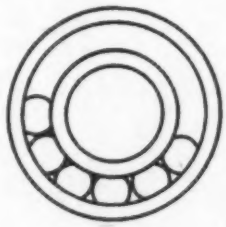


FIG. 4.

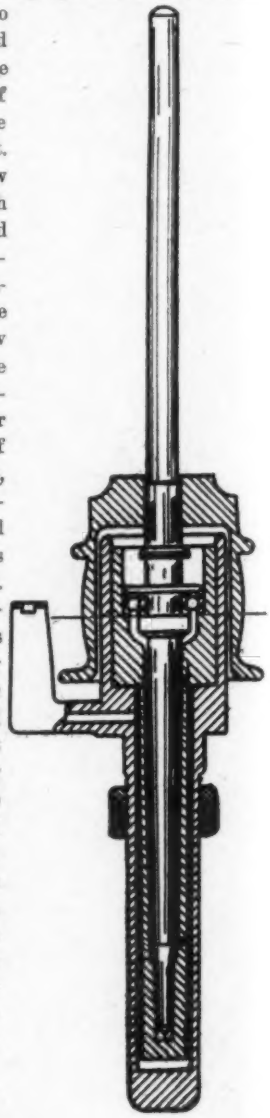
races about half filled with balls as shown in Figure 4. Then the balls are disposed around the circumference and some form of separator is used to keep them apart. Of course, such a bearing but partly filled with balls has not as great a capacity as a similar bearing completely filled with balls. A secondary use of the separator is to make a more quiet bearing. If a separator is not used each ball as it rolls around and out from the point of pressure is snapped out much as a small boy would snap an apple seed out from his fingers; and this snap causes the ball to hit its neighbor, making a humming noise. A separator is not necessary to make a good ball bearing even though many of the best ball bearings have them. It is a point in favor of the angular load bearing that a full quota of balls may be used and that no separator is necessary.

There are at present five general types of ball bearing spindles which have been developed. These types differ so much both in principle and detail that the characteristics of each type will be explained in detail.

In Type A (Fig. 5) a commercial ball bearing is adapted to any of the several makes of gravity spindle, the race being mounted in the bolster with a sucking fit to permit the race to creep and gradually present its whole surface to the point of wear. Originally this type of bearing was mounted with its center line coincident with the center line of the whorl; also in the earlier models the ball bearing was used only to carry the radial load caused by the band pull, the weight of the spindle and bobbin being carried on a plain thrust bearing at the foot of the blade. In a more recent development the bottom of the ball bearing is coincident with the center line of the whorl which results in a smoother running spindle. Also the ball bearing has been mounted so that it acts both as a radial and thrust bearing and carries the total load with the exception of a negligible radial load on the foot of the blade to steady it.

The Type A spindles follow the conventional design both from exterior appearances and from the bolster and oil circulation construction. Type A spindles equipped with any of the high grade ball bearings now on the market undoubtedly make satisfactory spindles. The making of them offers no greater difficulties than the making of a similar plain bearing spindle, as the difficult and highly technical work of making the ball bearing is done by the experts from whom the bearing is bought.

The application of the commercial ball bearing to spindles has been mostly made to twister spindes. This is partly because no concern makes a standard ball bearing sufficiently small to fit within a ¾" whorl of a spinning spindle, and partly because the high cost of a commercial ball bearing adds a greater percent to the price of a spinning spindle than it does to a twister spindle, —a two dollar increase in the cost of a spinning spindle would be prohibitive while a two dollar increase in the cost of a twister spindle might prove to be a good investment.

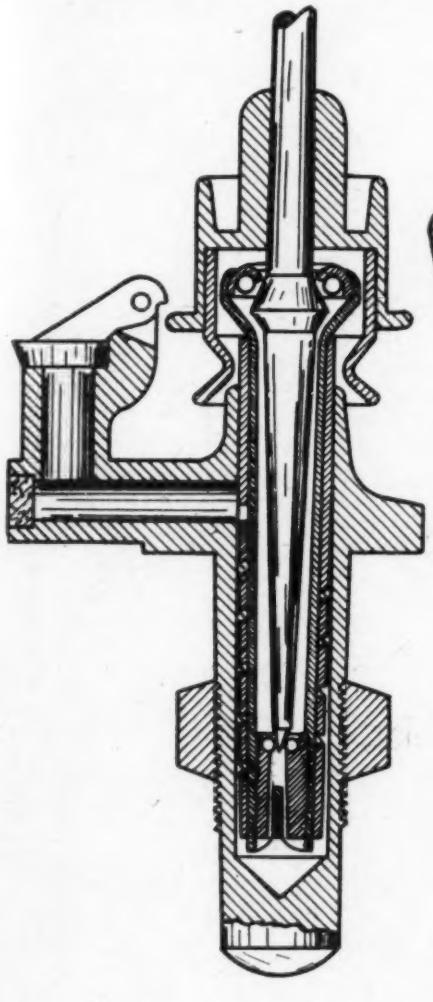


Type-A
Fig. 5

The question has been raised as to whether putting the highest grade commercial ball bearing in a spindle is not like putting a $3,000 body on a Ford car, for the capacity of the bearing is so much higher than is necessary for the work it is required to do. The belief in this and the high cost of the type A spindle has led to the development of types B, C, D and E, spindles in which a ball bearing is an integral part of the design.

Type B was the first ball bearing spindle to be made in any quantity. As seen in Figure 6, the blade is supported in a bolster by two ball bearings and the bolster is supported in a spring sleeve to permit the spindle to find its own center of rotation and to dampen vibration. When made accurately this spindle gave good results although its

bearings were originally of the three point contact type and the races were not ground, but merely polished. The Type B spindle had many of the essential points of successful design, but its makers did not devote their attention sufficiently to simplifying the design so that enough expense might be saved by the elimination of unessential parts to pay for the correct grinding of those most essential parts—the races. Except for a few of the first of these spindles the life was short, though their operation during their short life was excellent. The first Type B spindles put on the market were hand made by expert machinists and are still highly spoken of.

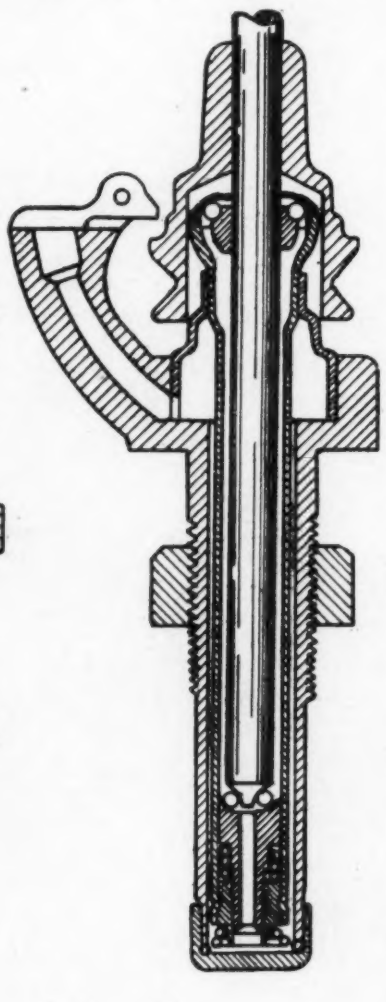


Type-B
Fig. 6

In other words, they showed that such spindles when *made right* would be satisfactory. This proof has given heart to later inventors who have devoted their energies to so simplifying the design that such a spindle might more cheaply and easily be made right.

The makers of Type B spindle found how real was the objection to the adjustable type of bearing; namely, that it was at the mercy of anyone with a wrench. Many of the spindles actually in operation were found to be adjusted so tightly that they either were ruined or soon would be. The makers claimed that the mill operatives had changed the adjustment of the bearings and the mill man claimed that the adjustment had not been touched; which naturally resulted in dissatisfaction and distrust on both sides. To overcome the difficulty as well as to produce a spindle which could be made profitably the same concern brought out the Type C spindle, Fig. 7.

The Type C spindle has a spring adjustment on the ball race at the foot of the blade and the supporting spring sleeve of Type B has been replaced by a small wire spring, also at the foot of the blade. With such construction it is impossible to tamper with the adjustment of the races without destroying the bolster and a fixed pressure of about five pounds is maintained on the races.



Type C.
Fig. 7

It is believed that the indifferent success of this type has been due to the use of wrong materials and insufficiently accurate workmanship.

Both Types B and C follow the conventional design in having a removable spindle (the bolster is removed with it) and a doffer guard of the Woodmancy pattern. The oiling and cleaning of the spindle is accomplished the same as in any gravity spindle.

Type D spindle, Fig. 8, is a further development which although of the angular load type, does away with the difficulties of faulty adjustment. As is seen, it has one ball bearing inside the whorl supporting the spindle and a plain step bearing in the bolster to check vibration. In these points it resembles the Type A spindle. It also is of conventional design, with removable blade, Woodmancy doffer guard, etc., but the bolster remains in the base and only the cone, balls and retainer can be lifted out with the blade, for the race which forms the neck at the upper end of the bolster case is permanently pressed into place. The Type D spindle obtains its adjustment through the weight of the blade and bobbin holding the balls down on their race, thereby maintaining a constant pressure on the bearings. However, the horizontal pull of the band will pull the blade sideways and raise it until the balls run on the vertical surface of the race instead of on the curved indented surface. The result is that the bearing will be loose and free to vibrate unless the vertical as well as the curved indented surface of the race be carefully ground internally until it has approximately the same diameter as the outside diameter of the assembled balls.

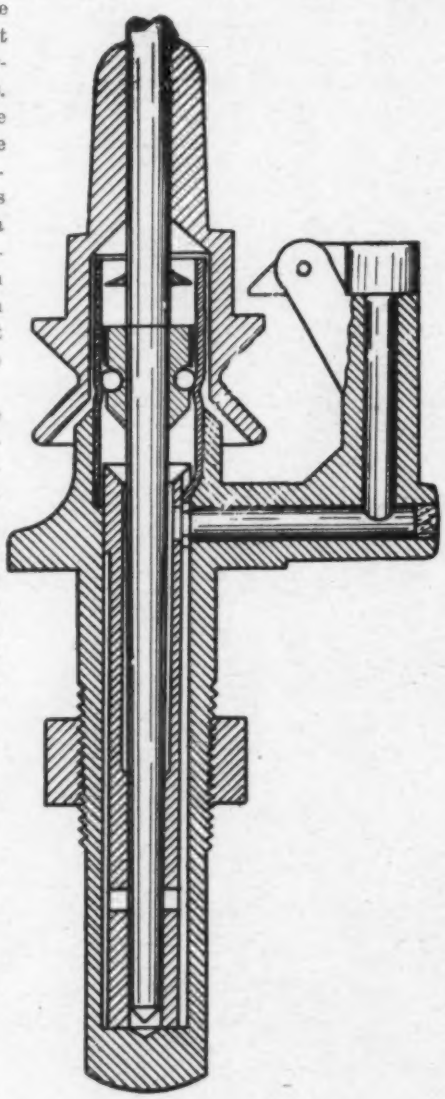
Also, although by this design it is intended to make the bearing fool-proof there is a possibility that some inquisitive mill operative may investigate the bearing by poking it with a screw driver or other tool. In such a way the retainer could be unseated, thereby releasing the balls, or, if too tightly fitted for that, the bevelled edge of the retainer might be nicked so that the nick interfered with the rotation of the balls. Such a criticism may seem to be making a mountain out of a mole hill and possibly it is. It is mentioned here because the makers of Type B spindle found that a ball bearing spindle had a fascination for mill operatives which made them want to discover from personal investigation just what was inside of it and they would do so if given the opportunity.

The ball retainer of the Type D spindle is of ingenious construction. This piece is purely a retainer and does not act as a separator. It consists of a thin steel shell with an inwardly beveled edge which holds the balls in the groove of the cone when the blade is removed from the base and does not touch or interfere with the movement of the balls when the blade is in the base.

The outer ball race is made from tubing, the indentation about this tubing which forms the ledge on which the balls run is made by a knurling process.

It has been demonstrated that the Type D spindle will run without excessive vibration with a badly balanced bobbin, even a bobbin with one quarter cut away. It has, therefore, a great capacity for carrying an unbalanced load, a feature not to be overlooked.

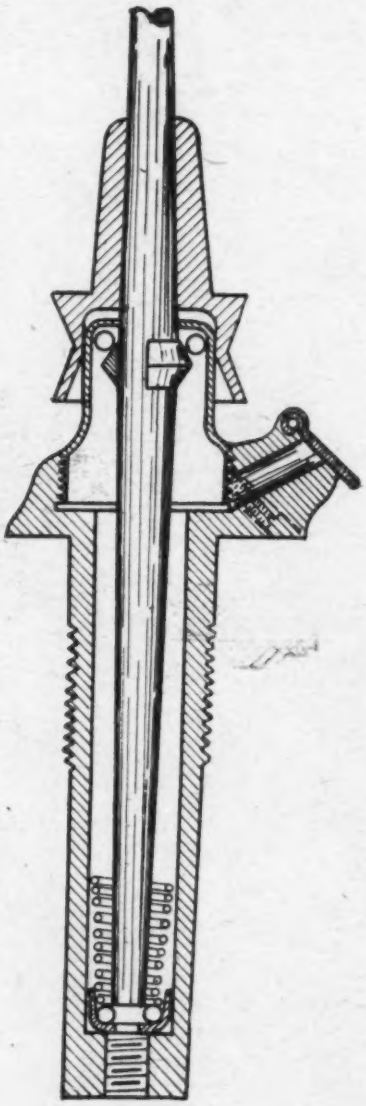
Models of the Type D spindle have been in successful operation for over two years now, and give promise of being a practical solution of the application of angular load ball bearings to spindles.



Type-D
Fig 8

Type E spindle (Fig. 9) is the latest development of a ball bearing spindle and is the most radical. The blade is not removable, it has no bolster and the general outward appearance is not copied after the style of the ordinary gravity spindle. The designer of it has attempted to resolve the necessary elements into their simplest factors and has made his design by starting with the blade alone and adding the ball bearings, casing, etc., to the blade in what seems to be a logical manner. The design has not been unnecessarily influenced by the shape and general design which the needs of the plain bearing spindle have evolved. Moreover, there are several advantages from building a spindle new from the ground up, for several features of design which have been found necessary with plain bearing spindles are not necessary with ball bearing spindles, and vice versa.

An example of this is found in the requirements for lubrication. In sliding bearing spindles provision must be made for periodically replacing the oil, as oil loses its lubricating qualities after it has been in use a certain time. Besides, the admission of lint and dirt into the bolster case makes the oil thick and gummy. In a ball bearing this replacement is necessary only if the oil becomes dirty, as the oil is needed mainly for a rust preventive and oil remains a rust preventive no matter how long it is used. Hence if a ball bearing is so mounted that dirt cannot easily enter, the oil will not have to be changed often though new



Type E.
Fig. 9

(Continued on page 666.)

Industrial Nurses

BY FLORENCE SWIFT WRIGHT, R.N.*

The nurse in industry has come to stay. Employer and employee alike value her service. She is a useful person in the plant.

I am often asked: "What are the duties of the industrial nurse?" I believe that within certain professional limitations whatever she finds to do—that is her duty.

This means that a full or part time physician should be employed by the company to direct the treatment of accident cases and of industrial diseases. If she goes into the homes she must work with the attending physicians of the patients for whom she cares. As she visits the workers she acts as a friend, a representative of the employer

or of the benefit association. Coming with neighborly service and counsel, she does not come with the idea of spying out personal matters. She should be as careful to be worthy of the trust and confidence of her patients as any private duty nurse.

There is no reason why she should not look up absentees—in fact, there are good reasons that she should perform this service. When her help comes promptly her advice will be more effective, as she reaches her patient

Let me first make plain her limitations. She is neither physician, surgeon, nor detective, nor must she take upon herself work for which another employee is responsible or better fitted. In all medical or surgical matters in plant or home, she must have the support of a physician and must work under his orders, whether he is company or family physician.

* Chairman, Industrial Nursing Section, National Organization for Public Health Nursing.

before he has discussed his case with all his friends, neighbors and relations, and before his mind is confused with their inevitably incongruous recommendations.

In those cases where there is not illness and where there is no other reason for the services of the nurse, the employment office can send someone to make any necessary follow-up visits. If there is doubt that the illness or injury is disabling, the nurse can have no responsibility. The industrial physician must diagnose and advise the company or the benefit association as to the handling of such cases.

In a large plant, others than the nurse may have the different phases of service to employees in hand. In such plants the cooperation between the nurse and the other workers must be carefully arranged. No one must expect the nurse to be directed in the technique of nursing by persons who are not nurses. Neither must the nurse expect to try her hand at recreational or other special work when there is a specially trained person being held responsible for such things. However, in many plants an industrial nurse has charge of all welfare work. This is a necessary plan in many a plant too small to afford the services of several specialists and is a practicable development in many larger organizations.

The various phases of industrial nursing as well as the different types of nurses may be best illustrated by describing the work of actual nurses in the industrial field.

Mr. A., owner of a food industry in a large city, decided to employ an industrial nurse. He saw women and girls disregarding the laws of health and thought of a nurse as one who might be able to help them. Many minor injuries were suffered by the workers and he hoped to save the expense of subsequent infection and compensation claims. He pictured an industrial nurse as a comfortable, helpful plant mother and housekeeper. His wife had recently undergone an operation and Miss B. had attended her to the satisfaction of patient, family and physician. Miss B. had graduated from a general hospital at nineteen and had practiced successfully as a private duty nurse for fifteen years. During this time her work had been with illness and with the care, rather than the prevention, of illness.

Miss B. went to the plant and sat happily in the first aid room she had planned. She embroidered while she waited for patients much as she had waited at home for the next case. The workers came, were pleasantly received, well treated and a physician's care secured when indicated. No infection occurred if the nurse saw the injured worker promptly. The employer was pleased until he noticed that the nurse passed many idle hours. Being thrifty withal he suggested that she assist in the employment office. Miss B. was indignant; her professional dignity had been insulted by the request that she do work which was not nursing. Lacking imagination to show her how much she could help the workers by seeing them on their first day in the plant, she resigned. A forewoman is now doing most of what this nurse did—not so well—but there are not many infections and most injured persons see the doctor in time. At least there is no loafing in that plant.

Mr. A. says an industrial nurse is a nice person but sadly over-rated, and an expensive luxury. Some workers miss the pleasant nurse.

Let us consider another phase.

Miss M. is reputed to be a very efficient industrial nurse. She "stands for no nonsense" in her first aid room within whose four walls she spends her days. Injured workers come and go—a steady stream. No one smiles; hardly a word is spoken by nurse or patient. The small wounds are carefully dressed but the nurse never inquires how they happened. The minor illnesses and headaches are treated by aspirin, by migrain. No physician sees the patient. No thought is given to the fact that dangerous drugs are carelessly administered. A patient entered the room saying that his head ached. He looked feverish and sick. "I'll give you something," said the nurse holding out a box. The man took three pills and went his way. The pills contained acetanilide, a dangerous heart depressant. When asked if she was sure that the man's heart was all right, if a physician had examined him and ordered the drug, she said there was never any trouble, that she could tell by the eyes if it was not safe to give the pills. She had never thought of inquiring into the cause of the headache. The man in question wore glasses which were perched askew on his nose which was badly inflamed from the pressure of the bent and twisted clip. He frowned continually and nervously fumbled with his glasses. It would have seemed that the most unobservant layman might have seen one possible cause for his discomfort.

An assistant was replacing a torn and soiled bandage on a workman and the nurse in charge called out: "Tell that man I said he was not to come back until day after tomorrow. I can't have them hanging around here all day." The nurse who heard is ashamed to admit that this woman is supposedly a member of her own well loved profession.

A Public Health Nurse in Industry.

Mr. C., a competitor of Mr. A., deciding to employ an industrial nurse, saw men and women careless or ignorant of the laws of health and safety in a plant not ideal. He thought of a nurse as someone able to help him make his workers careful, healthy people and his plant a safe and healthy place.

Through the National Organization for Public Health Nursing he found a nurse in his own city, Miss D. Miss D. is a *public health nurse*. After graduating from a large general hospital, she had training in each branch of public health nursing—prenatal care, child hygiene, tuberculosis, bedside nursing, social service, and venereal disease. This not only taught her to understand all sorts of people, but in addition to rounding out her experience made sure that she was not handicapped by extreme youth and immaturity. She had learned to seek the cause in addition to caring for the case. This special training and experience made it possible for her to work with a sureness and initiative which was impossible to Miss B., cloistered since girlhood in hospital and sick room.

On her first day in the first aid room, Miss D. saw several girls with small cuts on the left palm, some infected. Inquiry disclosed an unguarded knife. The foreman and a mechanic soon devised a protector and there were no more cuts of this sort.

Numbers of girls complained of backache, all came from one room. The girls were nervous and often stayed at home. Production in the latter half of the morning and afternoon was very low. A visit to the room revealed

that the seats of the chairs provided according to the law, were only three inches lower than the tables on which the work was done. Lower chairs with backs were provided. Correct postures were made possible, a five minute rest period, leaning back in the chair, eyes closed, hands in lap was enforced twice a day. Nervousness and backache became rare complaints. Absence decreased and production increased, becoming nearly even throughout the day.

Miss D. considers each "case" she sees as a trail leading to some neglected hazard. She continually studies the industry, works with safety man and foreman, employer and employee in weeding out every danger. She teaches and preaches and practices habits of health and safety. She will always be busy while any worker is careless or ignorant, even though her plant becomes as perfect as it can be made.

Miss D. is an educator as well as a nurse. She is a *public health nurse* in industry. Her employer says of her: "She is the most important person in the plant. She may stay with us as long as she likes and when she is ready to retire we will pension her." The workers love and respect her. Her word is law to them, and they are often heard to chide one another: "Don't, the nurse won't like it."

In order to present a well rounded picture of the public health nurse in industry let us see what industrial nurses are doing in one small town. Each town has different needs. Here the main industry is the reason for the existence of the village. It is a town without health agencies except local physicians and with no social agencies.

Miss X. began in a first aid room as did Miss D. and developed her work along much the same lines. She had the backing of a physician, employed by the company, who made a certain number of visits weekly to the plant but whose time was necessarily largely devoted to the actual care of industrial injuries. Aside from his cordial support and advice the educational and preventive work was left entirely to the nurse.

It was often necessary to send sick or injured workers to their homes. Anxiety for these people brought the nurse to see them after hours, on Saturday, on Sunday. Finding that she could not endure such long hours she brought these cases to the attention of her employer, telling him how often there was no one to care for the sick or injured worker and how disability was in this way many times unnecessarily prolonged; how harm was sometimes done by the unskilled work of family or friends.

He was lead to employ one assistant nurse, then another. This visiting nurse work is now financed by cooperation between the employees' benefit association and the employer.*

The nurses have a car and visit all absentees, not as detectives but as representatives of the benefit association and of the employer and ready to give actual bedside care and to teach the proper care of the invalid to some member of his family if such service is needed.**

Visits to the homes give the nurse her best opportunities to increase the efficiency of the workers. She finds the man at home caring for a sick wife. She assumes the care, calls a doctor, gets his orders, finds a neighbor to help, teaches her what to do; and the man, his mind at rest, goes back to his work.

She finds the fretful baby, badly fed, wrongly dressed, without water, baths, fresh air. She teaches the young mother and the result is a quiet home and supper ready for the breadwinner at six o'clock. After a quiet night, the man is ready for a good day's work. A mother said one day: "Being regular with the baby is grand! He's the eighth and this is the first time since my first that I can call my soul my own. Now I feed him like you say. He is good and sleeps and plays. I clean the house and sew and cook. I never had so much time before. Pa, he thinks Herbie is the best baby we ever had. I tell him it's all the nurse."

The industrial visiting nurse finds the wayward daughter an anxiety to the father at work. She helps the mother to understand and protect the girl, to allow her reasonable freedom and pleasure. The child may be saved from social danger.

She finds the young woman who can not stand the speeding-up in a certain process. Perhaps she traces a relationship between lower production and beginning illness.***

Each day brings new problems to solve and with them a wider field for service. Miss X. now directs a large staff. She is responsible for a nursing center with classes for expectant mothers and for the care of well babies as well as first aid and home nursing. There are also classes for "little mothers," organizations of Camp Fire Girls and Boy Scouts in addition to sewing classes and a kindergarten. Miss X.'s main trouble is that her work insists on growing faster than she can develop facilities to handle it. She directs the work of an assistant who has charge of a lunch and rest room. She or an assistant interviews each new worker and each one resigning. By this means the workers are placed with a view to their fitness to the work they will be expected to do and causes of dissatisfaction and discontent are discovered. This is a satisfactory method of taking the pulse of the plant and a guide to the soundness of its organization. The nurse who is the trusted friend of the workers will be their confidant when another person might find it impossible to get at the real reasons for a large labor turnover.

The time given the plant by the company physician has been increased in order that workers may have careful medical examination when advisable. Miss X.'s employer is not convinced of the utility of routine medical examinations for all workers. In fact the workers in this

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*In another town similar work started by the industrial nurse has led to the formation of a local visiting nurse association which is partly self-supporting, serving all classes and collecting fees from those able to pay.

**In many towns where there is a visiting nurse association an arrangement exists whereby the industrial visiting nurse reports to the association all cases she finds who need bedside care, the firm, the benefit association or the employer paying to the visiting nurse association the cost of each necessary nursing visit. This method helps support a needed non-charitable community health agency and makes possible the nursing care and instruction of a large group of workers with the minimum number of industrial nurses. Workers resent any implication of charity and in towns where the visiting nurses do not serve all classes, and where they do not collect payment for their service, affiliation with industry is a dangerous experiment. Patients actually unable to pay and those needing material relief should, of course, have consideration. The whole question of the home care of workers should be handled in one of two ways—the service should be supported by the workers themselves, or if financed by the employer, it should be made very clear that the service is as necessary as proper guards on dangerous machinery.

***Production sheets are checked up by some industrial nurses in order that it may be discovered if anything in the physical condition, habits, home conditions, state of mind or surroundings at work have a bearing on inability of the worker to keep up to the standard of production.

industry are at present strongly opposed to such a measure.****

Miss X. has plans for the future. She can not stand still. She will not talk about these plans. She says she is not ready. She must not only know the need but prove it; not only know the remedy but demonstrate its potency.

On the whole, industrial nurses make good records for themselves. The very worst one described was valuable to her employer. He said so. While the workers certainly did not love her she undoubtedly saved them pain and trouble.

The failures of industrial nurses have been largely the fault of their training or due to their isolation from others engaged in similar work. Much misunderstanding and inefficiency is without doubt due to lack of standards for industrial nursing. These faults are being corrected. Excellent training is now available. Industrial nurses are taking steps through the National Organization for Public Health Nursing to formulate high standards for nursing service in industry.

Employers must also acknowledge responsibility for some failures or partial failures. The employer must be given credit for each success. Without his trust, understanding and help little is possible except a perfunctory care of small industrial injuries and the consequent reduced expense for surgical treatment.

Employers sometimes underestimate the potential value of the nurse in industry and so fail to exercise the discretion in choosing a nurse that they would consider necessary when looking for an executive or a specialist for another equally important post.

The value of the industrial nurse to the plant is a matter of growth. No nurse, however efficient, can do more than begin with limited responsibilities. The scope of her work will be broadened as she is able to prove her value. Industrial nursing is a pioneer field, together with most activities which have to do with the human element in industry.

The right woman in the work, the real woman with a sense of humor and with imagination to see her work in its broader aspects, can never cease to increase her usefulness to the employer, to the employees and to the community.

****In other plants where the employer provides physical examinations, the industrial nurses have convinced doubting employees of the value of such regular examinations by making practical demonstrations of the preventive work made possible by such measures.

Spontaneous ignition was the cause of two January fires in southern mills with a total loss approximating $5,000. One was due to unprotected oily rags and the other to an unemptied box of sweepings. Proper equipment would have prevented both of these fires, even if the system for proper cleaning and the removing of oily rags and sweepings did break down owing to the fallibility of the human equation.

The Lovingood Company, 14 Walker Street, Atlanta, Ga., has been appointed southern representative for the Chicago Watchman's Clock Works, Chicago, Ill., and the Davenport (Iowa) Manufacturing Co., makers of the Schick all metal waste paper baler.

Ball Bearing Spindles.

(*Continued from page* 662.)

oil should be added occasionally to compensate for the loss of oil through leakage or evaporation.

It will be noticed that this spindle returns to the use of two ball bearings as in Types B and C. The ball bearing at the step of the blade is *not* placed there merely to eliminate the slight friction found in the step bearing of the Types A and D spindles. Such friction is negligible. But by adding the second bearing and properly proportioning the disposition of the load, the unit load per ball is reduced one half. Here lies the value in the design of the Type E spindle. A commercial ball bearing is too expensive for a spinning spindle; and a single angular load bearing will rarely have the same capacity as a commercial bearing of equal size and number of balls, although it is very much less expensive to make. Therefore, by increasing the capacity of an angular load bearing (through making two bearings with light loads do the work of one bearing with a heavier load) the two very much less expensive bearings may be used to give the same results as though a single commercial bearing were used. As compared with the Type D spindle the bearing capacity of the Type E is more than double.

The objection to the adjustable ball bearing—that anyone capable of handling a wrench can ruin it—has been met in the Type E spindle by locking the adjustable upper ball race with a set screw. The head of the set screw is sealed and it is the intention of the designer that the manufacturer's guarantee on the spindle shall be void if the seal be broken.

The success of this scheme depends on the very human trait that a person who would out of curiosity take an unsealed mechanism to pieces would hesitate to break a seal to do it. An example of this trait is in the sealing of freight cars by a simple and evident lead seal. Although freight car seals may easily be broken, even thoughtless small boys hesitate to break one and generally confine their trespassing to cars which are unsealed. Further safety is provided through the fact that it is difficult to discover from examining an assembled Type E spindle how the bearing is locked and when the spindle is on the rail it is impossible to tamper with the seal.

Since the blade is not removable, provision for changing the oil must be made by some other means than the usual method of removing the blade and swabbing or pumping out the old oil. A pipe plug in the bottom of the base can be removed allowing the oil to drain out. The spindle can be drained and flushed without stopping its operation. It is doubtful if it is of advantage to be able to change the oil without stopping the spindle because changing oil in a ball bearing spindle is rarely necessary.

Gyrations of the spindle are checked by a spring acting on the lower ball race. This spindle also will run well with a bobbin from which one quarter has been cut away.

It promises to be the most advanced development in the application of ball bearings to spindles because it combines a ball bearing having a good factor of safety and a ball bearing whose cost is not excessive.

Two southern mills suffered tenement losses through roof fires in February. Fire resisting roofs prevent such occurrences.

Aniline and Its Uses in the Dyeing and Calico Printing Trade

BY WILLIAM B. NANSON.

PART FOUR.

The introduction by Lightfoot in 1863 of a practical method of printing aniline black almost immediately suggested to calico printers the desirability of producing white and colored effects under printed "covers" and "pads" of so important and fast a color. The first experiments in this direction were based upon the fact that aniline is an oxidation product; hence the earlier resists consisted of reducing agents. Later on it was ascertained that the presence of a mineral acid, either free or produced in steaming or ageing, by the disassociation of an unstable salt, was quite as essential as the presence of an oxidizing agent to the development of the aniline black. Alkaline salts and other neutralizing substances therefore were employed either as such or in combination with reducing agents to prevent the formation of aniline black in certain parts of the cloth. By printing patterns in colors, containing sulphocyanides, xanthates, thiosulphate of soda, tannin, sodium carbonate, chalk, etc., many excellent results were obtained; but it was not until Prud'homme brought out his well known process that the "aniline black resist style" became popular in the calico printing industry.

Up to that time it had been possible to dye the cloth on one side only and that by means of printing with a pad roller. The goods were first printed with a resist, then dried and printed with thin aniline black paste on the printing machine. In Prud'homme's process, however, the second printing is dispensed with, the cloth being "blacked" by passing through a solution of aniline containing all the ingredients necessary to the formation of aniline black and the cloth is subsequently steamed. In this way the material is dyed uniformly on both sides and has a much richer appearance than when the black ground is printed with a machine.

Although all patterns on aniline black ground, except those produced by direct "blotch" printing, are obtained by means of resist pastes of one sort or another, they are classified in two different categories according to their mode of execution. If the resist pastes are printed on the cloth before the black padding liquor is applied to it, the effects so obtained are known as "resists;" if, on the contrary, the cloth is padded with the black liquor before the resists are printed they are known to the trade as "discharges."

Properly speaking, they are not "discharges" at all, for the black is only developed by steaming *after* the resists have been printed and is not developed on the printed parts; but the term "discharge" is useful to distinguish between the two methods. The "resist" and the "discharge" processes both have their advantages and disadvantages. By the former, pure whites and bright colors are almost always obtained without the slightest difficulty, but the impression of the pattern is often lacking in sharpness. On the other hand, a crisp definition of the design with clear cut edges is characteristic of the "discharge" process, but unless the utmost care is exercised at every step of its application, the whites and colors are very apt to become dull and dirty in appearance.

In spite of its greater difficulty, however, the discharge process is usually preferred for high class work, because when employed under favorable conditions it yields color effects of greater depth, richness, fastness and variety than can be obtained under the resist process.

Prud'homme's original aniline black discharge process is still in use at the present time, but many improvements and some modifications of it have been introduced by various chemists and practical calico printers, most of the improvements having been effected in the direction of applying new coloring matters and different resisting agents.

Briefly described, the process is as follows: The white bleached cloth is first padded in a steam or prussiate black composed of aniline hydrochloride, chlorate of soda, and potassium ferrocyanide; the cloth is then dried gently in such a way as *not* to oxidize the aniline, this requires judgment and care. The cloth is then printed with the resist pastes, and then dried and steamed for about three minutes in the rapid ager so as to develop the aniline black and fix the resist colors should there be any. The goods are finally chromed, washed, soaped and dried as we have already described in a previous section. This mode of procedure constitutes the "discharge" method of printing aniline black.

In the "resist" mode of procedure the process is very similar except that the resist pastes are first printed on the plain white unpadded cloth, they are then thoroughly dried and, in the case of some styles, aged or steamed, then padded in the prussiate aniline black liquor as before, dried again and steamed, chromed and washed, etc., as in the discharge style.

The color pastes for the "discharge" process may or may not contain opaque plastic substances, but in the "resist" method it is essential that the color pastes should contain plastic bodies in the shape of zinc oxide, china clay, etc.

The resisting agents most commonly used are zinc oxide, zinc acetate, magnesium acetate, sodium acetate, all of which act by neutralizing the acidity of the black, and sulphocyanide of potash and sulphate of potash, which act as reducing agents.

In printing various colored effects with the resist pastes, we have many coloring matters available but only the direct colors, basic colors and pigment colors seem to have met with any great measure of success so far. Sometimes in some special way the vat color pastes have been used, their success being through their alkalinity being desirable for certain styles. Again, the sulphur colors have been used where great fastness was required but they are not easy to handle. Taking everything into due consideration, however, the basic colors give the best and most satisfactory results as they are capable of being

mixed in any proportions and yield the brightest and largest range of colors; in this way they are certainly the most useful for they can be made to yield both bright and sad tints and dark and full shades where required.

The pigment colors are used chiefly for yellows and oranges, and the direct colors are used mostly on goods that have to withstand the action of caustic soda, as in crinkled effects.

A great many different methods have been employed for resisting aniline black but all are founded on about the same principles and governed by the same considerations. In the methods we shall enumerate below the recipes will be taken, some of them from actual practice of the writer or the result of definite experiment, and many of them from published facts; also suggestions by men who know whereof they speak by practical experience.

Discharge Styles on Aniline Black.

In this "discharge" process the cloth is padded in aniline black liquor *before* the color or white discharge paste is printed upon it. The condition of the cloth after padding is perhaps the most important factor in determining the purity of the white and the brightness of the finished colors. It is essential that the following precautions should be strictly observed if good results are to be expected:

(1) The discharge pastes must be printed on cloth on which the black is unoxidized. This is absolutely essential and can only be insured by using a freshly prepared aniline black solution and by drying the cloth at as low a temperature as the speed of the drying apparatus will allow. Aniline black liquors which have stood for some time become partly oxidized and impart a greenish color to the cloth. The same effect is also produced by drying at too high a temperature. In either case dirty whites and flat colors are the result. On emerging from the drying machine the goods ought to be of a light yellow tint without a trace of green. If they are at all green they are unsuitable for light colored effects and must be utilized, if possible, for the printing of opaque pigment colors such as yellows, oranges or greens.

(2) The goods must be cooled at once after drying to avoid oxidation of the aniline and should be printed as soon as possible. The black oxidizes and develops very fast in the warm atmosphere of a calico print works, especially when the pieces are warm from the dry cans.

(3) After printing great care must be taken not to overdry the goods as this deadens the black very materially and robs it of its bloom.

(4) The goods must be steamed immediately after printing, and before the cloth becomes of a dark green shade. The steam must be at 194 to 203 degrees F., and ought not to be too moist, otherwise the colors are apt to run and the whites become yellowish.

(5) The whole process, from start to finish, must be carried out without any waits being allowed between the various operations. This also applies most fully to the chroming and washing which should be carried out as soon as convenient after the goods are steamed.

Process: Pad the cloth in black (a) as follows:

(1) 75 grams aniline salt, 200 grams water; (2) 35 grams chlorate of soda, 400 grams water; (3) 40 grams yellow prussiate of potash, 250 grams water.

Mix (1), (2), and (3) immediately before use. Black (a) is used more especially for heavy goods and ordinary mercerized goods; for the latter it may be diluted to some extent (3 parts black, 1 part water) and still give a full shade.

Or, pad the cloth in black (b) as follows:

(1) 85 grams aniline salt, 150 grams water, 50 grams 6 per cent gum tragacanth thickening; (2) 39 grams chlorate of soda, 300 grams water; (3) 45.5 grams yellow prussiate of potash, 330.0 grams water.

Mix (1), (2) and (3) in the cold and make into 1 liter before using. Black (b) is employed when a denser black is wanted; for most purposes, however, the weaker and cheaper black (a) is sufficiently dark.

After padding, which may be done on any ordinary 3

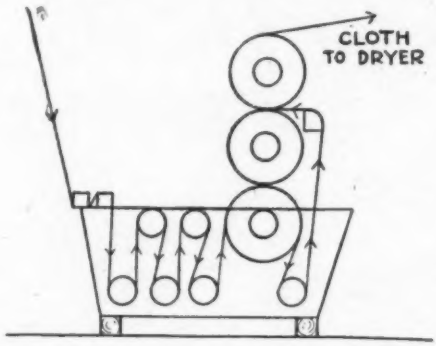


FIG. 1. THREE-BOWL PADDING MACHINE.

bowl padding machine fitted with rubber rolls (see Fig. 1.), the goods are carefully dried as previously specified, and then printed with any of the following resists or discharges:

Pigment discharges: Pigment and lake colors are fixed by albumen; the resisting agents employed are either soda ash or acetate of soda. The figures show parts of each by weight:

Yellow: Chrome yellow paste, 400; soda ash, 75; 6 percent tragacanth thickening, 325; albumen solution (50 percent), 200.

Orange: Chrome orange, 350; other materials same as yellow.

Red: Vermillion, 200; water, 250; soda ash, 75; 6 per cent tragacanth thickening, 200; albumen solution (50 per cent) 250; turpentine, 25.

Blue: Ultramarine blue, 330; glycerin, 30; water, 105; soda ash, 75; 6 per cent tragacanth thickening, 110; albumen solution (50 per cent), 350.

Green: Chrome lemon paste, 150; Guignet's green, 200; glycerin, 30; acetate of soda, 200; 6 percent, tragacanth thickening 200; albumen solution (50 per cent) 200; turpentine, 20.

The ingredients must be ground together in a mill before using. Print on black padded cloth; steam 3 to 4 minutes on the rapid ager; pass through a ½ per cent solution of bichromate of soda at 50 to 60 degrees C.; wash well, soap and dry.

Zinc oxide discharges: In these discharges the coloring matters employed are the basic colors. Their fixation is effected by the zinc ferrocyanide formed by double decomposition during the steaming. The addition of albumen increases the fastness of the colors, and their brilliancy is further increased by padding the cloth in Turkey red

oil previous to passing it through the aniline black bath. Excess of oil must be avoided, however, otherwise the development of the black is retarded. In practice a solution of ammonia oleine (sulphoricinoleate of ammonia) corresponding to 1¼ per cent of fatty acid is used with success in conjunction with either black (a) or black (b). Pad the cloth in the oil, dry on the cans, cool off and pass through the aniline black bath, dry at a low temperature, preferably by hot air, and print on the "discharges." Then steam, etc., as described.

A mixture of potassium sulphite, sodium bisulphite, and acetate of soda produces the best whites. Light colors are improved also by the addition of the same mixture to the paste used for reducing them to shade. For dark colors, zinc oxide and magnesium acetate give satisfactory results, without any further addition of other resisting agents.

In all zinc oxide resist colors it is advantageous to add a little albumen for the purpose of rendering them more resistant to the action of soap. Soaping increases the beauty of the black, the brightness of the colors and the white, and in many cases is necessary, if only to get the cloth into the proper condition for the finisher. Therefore, it is plain that if the color pattern is to be preserved, each color must be reasonably fast to soaping.

The following basic colors are to be recommended as resist or discharge colors for aniline black. They are very fast to soaping and washing and are bright and clear especially when printed on cloth previously prepared with Turkey red oil as has been described. Moreover, they possess the merit of having withstood the test of many years of application. The figures are parts by weight:

Red: Rhodamine 6G extra, 23; Auramine O, 2; glycerin, 30; water, 150. Dissolve and add 6 per cent tragacanth thickening, 95; discharge paste X, 600; mix well and add albumen solution (50 per cent), 100.

Pink: Rhodamine B extra, 2; Rhodamine 6G extra, 10; glycerin, 20; water, 133. Dissolve and add cold water, 35; 6 per cent tragacanth thickening, 100; discharge paste X, 600. Mix in well and add albumen solution (50 per cent), 100.

Gold: Rhodamine 6G extra, 0.5; Auramine O, 20; glycerin, 30; water, 114.5. Dissolve and add cold water, 36; 6 per cent tragacanth thickening, 100. Other ingredients same as for pink, excepting glycerin, 30.

Yellow: Acridine Yellow G, 20; other ingredients same as for gold.

Green: Acridine Yellow G, 22; new solid green 2B, 10; glycerin, 30; water, 110. Other ingredients same as yellow except cold water, 30, and tragacanth thickening, 98.

Blue: Thionine blue GO, 20; other ingredients same as for gold except water, 115.

Navy: Marine blue S, 20; other ingredients same as blue.

Purple: Methyl violet B extra, 20; other ingredients same as navy.

An orange can be made from 1 part of the red given above and 3 parts gold; an olive of 1 part pink, 6 parts yellow and 2 parts blue; a brown of 8 parts pink, 24 parts yellow and 1 part blue; a peacock blue of 1 part green and 3 parts blue.

Grey shades are not easy to make from basic colors on account of the fact that colors that are composed of three or more bright luminous colors are always difficult to match accurately. If such brilliant colors as Rhodamine, Auramine, Methyline blue, etc., are mixed together to give a complex mode shade (fawn, drab, grey, etc.) it will be found on making a second batch of color that the slightest excess of any one of them over the amount previously employed will make a very great difference in the resulting shade of the color; and that it is, as a rule, extremely difficult to get the same shade twice alike, more especially if it be light and of a delicate tone.

Grey shades are therefore usually made from pigments something like this: 140 grams Ultramarine powder, 70 grams lamp black powder, 490 grams 6 per cent tragacanth thickening. Grind these ingredients together and add 200 grams 50 per cent albumen solution, 200 grams acetate of soda; make into one liter and grind the whole together before using.

The discharge paste X referred to is made as follows: 100 grams zinc oxide, 150 grams magnesium acetate, 250 grams 6 per cent tragacanth thickening, 100 grams starch paste. A reducing paste for light shades is made from: 700 grams discharge paste X, 250 grams white discharge paste XX, 50 grams 40 per cent egg albumen solution.

White discharge paste XX for black and white styles is made as follows: 100 grams starch, 60 grams British gum, 300 grams potassium sulphite 90 degrees Tw., 290 grams water. Boil and add 150 grams sodium acetate. Cool off and add 100 grams of bisulphite of soda 66 degrees Tw. and 2 grams of ultramarine to blue the white.

This white discharge paste XX gives a very clear, pure white on cloth which has been newly padded. However, if the goods have lain too long or have been carelessly dried or have become slightly green through other causes, a good white may still be obtained by printing a resist containing a little hydrosulphite of soda, thus: 385 grams starch paste, 385 grams 6 per cent tragacanth thickening, 30 grams hydrosulphite N. F. conc. Heat to 60 to 70 C. to dissolve the hydrosulphite, cool and add 200 grams acetate of soda.

All the basic colors and white discharge given are printed on cloth prepared as follows: First pad in 100 grams Turkey red oil 25 percent, 1,900 grams water. Second, dry the goods gently so that the cloth leaves the drying machine with a light yellow tint only.

After printing, the goods are carefully dried and steamed at 194 degrees F. for 2 or 3 minutes in the rapid ager. They are then passed in the open width through a lukewarm chrome bath containing about 5 grams bichromate of soda to 1,000 grams of water, washed well, soaped lightly at 140 degrees F., washed and dried.

It is possible to make colored discharges with zinc acetate alone but not so advisable as they are neither so fast nor so bright. They are made something like this: 20 grams basic dyestuff, 200 grams water, 50 grams acetic acid. Dissolve and add 280 grams 6 per cent tragacanth thickening, 300 grams starch paste and 150 grams acetate of zinc in crystals.

In this case the zinc acetate not only prevents the development of the black during steaming but by a double decomposition with the yellow prussiate in the black mixture it forms zinc ferrocyanide, which fixes the basic color used.

Oxide of zinc alone gives very bright resist effects, but the colors look like pigment colors owing to the large amount of solid opaque matter they contain. This may be an advantage in some styles but for such goods as sateens or flannelettes it does not work well and the color needs to be as transparent as possible. In actual practice the zinc oxide in colors for sateens or flannelettes should not exceed 10 per cent.

As tannate of antimony is known to be the best mordant for basic colors it has been proposed to pad the cloth in the usual way as for dyeing with the basic colors with drying as usual, and then printing on a thickened mixture tannic acid and tartar emetic under a prussiate black, of a basic color solution and acetate of soda, followed by steaming, chroming and washing. Acetate of magnesium or acetate of zinc may also be used as resists, and are indeed to be preferred, as their hydrates exercise little or no injurious influence on the basic colors. Acetate of soda, on the contrary, if used in excess, is apt to yield bad results with some of the basic colors, especially if they are delicate in shade.

During steaming, the basic color combines with the tannate of antimony to form an insoluble lake, while the metallic acetates prevent the development of the black on the printed parts of the cloth.

The colors produced by this method have the advantage of containing no zinc oxide or other insoluble matter, neither do they impart any stiffness to the cloth, nor fill up the fiber like the zinc oxide resists. They possess a beautiful quality of transparency and are unsurpassed for softness of effect. In brightness, however, they fall behind the colors produced with oxide of zinc; and as the zinc colors are also capable of yielding subdued effects, having a sufficient amount of transparency, they have practically displaced the acetate basic color discharges on antimony tannate.

Apart from all other considerations the acetate basic color discharge is too expensive and slow to compete successfully with the zinc oxide process, which leaves little to be desired in the way of either brightness, softness, transparency or fastness, and which is undoubtedly far superior where the purity of the white is concerned.

In the case of certain classes of sateens and flannelette goods in which a certain softness of feel is the great desideratum, and for velvets where rich effects in dark colors are desired, the acetate basic color discharge may possess considerable merit.

(This is the fourth of a series of articles on this subject. Others will appear in subsequent issues.—Editor.)

The Walke Box Co., Norfolk, Va., manufacturers of box shooks, can give prompt shipments on their materials. They manufacture box shooks only, from North Carolina pine, and have been in the business for three years. A railroad side track runs up to the loading platform of the plant, which covers a half acre.

It is announced that a textile exhibition will be held in Boston some time during the spring of 1921 by the Textile Exhibitors' Association. The exact dates have not as yet been set but it is stated by the secretary that an announcement concerning this will be forthcoming soon.

World Cotton Conference.

Advice has been received from Rufus R. Wilson, General Secretary of the World Cotton Conference, that the date of the next meeting has been fixed as June 13 to 22, 1921. The sessions of the first three days will be held at Liverpool. The delegates will then proceed to Manchester, where the remaining sessions will be held.

The Conference to be held in England bids fair to surpass any gathering in the history of the industry, not only in point of attendance, but in the scope and importance of its work. The first World Cotton Conference, held at New Orleans last October, was a distinct success. Much was accomplished at that time; close and cordial relations were established through mutual intercourse and personal contact; a spirit of hearty cooperation was aroused; the body became a permanent organization, with a definite purpose, and the wheels were set in motion for real achievement in the solution of the many problems now facing all cotton interests. The next Conference will bring to its task a perfected organization, committees whose work is definitely outlined and an enthusiasm born of the knowledge of the power of coordinated effort and the cooperation of those who firmly believe that the welfare of each unit is best served by that which benefits the industry as a whole. Arrangements are rapidly taking form for a program which will be of vital interest to all engaged in the production, handling and manufacturing of cotton and its products.

Nor have arrangements for the enjoyment of the delegates and their guests been neglected. The last day at Liverpool and two days during the Manchester meeting will be entirely devoted to their entertainment. Steamship and train arrangements for the entire trip are in the hands of the Eaves Steamship and Tourist Agency of Boston, which has been appointed Transportation Manager by the Executive Committee. Very attractive itineraries are now in preparation for those who desire to extend their travels to the Continent after the Conference.

"Like Finding Money."

This is the title of a new booklet which has just been issued by the Famous Manufacturing Co., with general office and factory at East Chicago, Ind. It contains 16 pages and describes the "Famous" and "Champion" baling presses made by this company. It is also illuminated with pictures of the different types of these presses, which are made for use in the baling of all kinds of scrap, waste paper, rags, shaving, leather findings, etc., and it is claimed that they combine simplicity and serviceability. The company announces that copies of this booklet will be sent to those who make requests for them; these requests should be made direct to the company issuing the folder.

David Lupton Sons Company, of Philadelphia, manufacturers of steel sash and related products, have opened southeastern headquarters in the Candler Building, Atlanta, with William D. Calley as Atlanta manager and Seth Ridout as assistant. In connection with these new offices, the company plans to open a warehouse in Atlanta, where a complete stock of rolled steel products for daylighting and natural ventilation will be carried.

Yarn Costs That Guide Selling Policies

BY JAMES F. HAMLIN.

"Today a mention of the war is not enthusiastically received, for the happenings of the past year have overshadowed the abnormal war conditions. Many industrial lessons were learned from the contingencies that arose during the period 1915 to 1919, and manufacturers to some extent have taken advantage of them. I will relate herewith the experiences of a few yarn mills in the Mohawk Valley, which I have had occasion to visit installing cost systems.

"During the war these mills were running to maximum capacity to meet the demands for soft spun hosiery yarn used in the manufacture of cotton underwear. Due to the tremendous amounts wanted by various concerns, the price of the yarn advanced rapidly, until the quotations for the commodity were almost prohibitive and the government concerned itself in the matter.

*An abstract from an interview with Stephen R. Gordon of Miller-Franklin-Bassett & Co.

"A number of the representative New York State spinners and underwear manufacturers had been invited to submit to the Federal representatives the costs of spinning yarn, in an attempt to more equitably adjust the government price, and I was invited by the president of a large underwear and yarn mill to appear with him before the textile division of the War Industries Board.

"All persons interested in yarns know that the prices fixed by the government were not universally satisfactory. This is in part proven by the fact that many of the yarn manufacturers sent their salesmen out after the prices had been set by the government and took contracts, in some cases over, and in others under the fixed prices.

"The prices of yarn first published by the government were fixed after an exhaustive study of the costs which had been submitted by a majority of the representative manufacturers of the country. It is obvious then that the costs submitted for comparison before the Federal authorities

MILL No 1 — EXPENSE ANALYSIS

Ex. No.	DEPARTMENT	THIS YEAR Month of January	THIS YEAR Period to Date	LAST YEAR Same Month	LAST YEAR Same Period	THIS YEAR Month of February	THIS YEAR Period to Date	LAST YEAR Same Month
	Speeder Dpt.							
	Foreman & Assistants.	250 00				260 00	510 00	
	Misc. Indirect Labor.	150 00				140 00	290 00	
	Repairs to Mchy.	105 65				98 00	203 65	
	Misc. Supplies	10 20				7 25	17 45	
	Oil	24 50				32 50	57 00	
	Belting	5 60				10 50	16 10	
	Brooms	4 60				3 25	7 85	
	Maintenance Labor	30 20						
	Expense	27 65				24 50	54 10	
						2 300	50 65	
	Total Direct Expense	607 90				594 00	1201 90	
	Share of Depreciation	24 30				24 30	48 60	
	" " Taxes & Insurance	10 40				10 40	20 80	
	" " Boiler	52 20				30 00	82 20	
	" " Power.	255 20				240 00	495 20	
	" " Gen. Mill.	424 02				399 25	823 27	
	Total Department Exp.	1314 02				$ 1302 45	2616 97	
	Total Speeder Prod. Labor.	1640 00				$ 1724 30	3364 30	
	% Exp. to Prod. Labor.	84%				75.5%	79.1%	
	Normal % Exp. to Prod. Lab.	84%				84%		
	Total Normal Expense	$ 1483 69				$ 1533 17		
	Abnormal "	+ 109 67	Gain			+ 169 28	Gain	
	Total Unit Lbs. Produced.	147192				152210		
	Labor Cost per Unit Lb.	$ .0111				$ .0113		
	Normal Lab. Cost per Unit Lb.	$ .010				$ .010		
	Total Normal Labor	$ 1766 30				$ 1825 20		
	Abnormal "	+ 126 30	Gain			+ 100 90	Gain	

FIG. 1. THE EXPENSE ANALYSIS.

YARN COST CARD

DISPOSITION Store House 1 YARN NO 16s

DESCRIPTION Carded Cotton Yarn. DATE Sept 20-1918.

DESCRIPTION			P. C. LOSS	WEIGHT	PRICE	LABOR	P. C. EXP.	EXPENSE	TOTAL
Pick, Mix and Lap			14½	117	.16	.1872	208	.3894	.5766
Card				117	.25	.2925	240	.7020	.9945
Comb									
Draw and Slub			.5	100.5	.53	.5327	97	.5167	1.0494
Speeder	U	1.00		100.5	1.20	1.2060	84	1.0130	2.2190
Spin	U	1.46		100.5	1.15	1.6874	97	1.6368	3.3242
Doubling					.40	.4020	97	.3899	.7919
Cone Wind	U	1.25	1.0	101	1.25	1.5781	83	1.3098	2.8879
Total						5.8859		5.9576	11.8435
Cotton			14½	117	.3487				40.7979
Loom									.2415
Loom, paper etc.									
			100 - Labor & Expense - Spin - 8.956						
Total Cotton									
Total Labor Exp. and Mat.									52.8829

Cond'l .5288

TOTAL COST $ 52.88 TOTAL LBS FIN. 100 COST PER LB Doffing .4975

FIG. 2. YARN COST CARD.

must have been wrong if the prices were fixed too high or too low. It is unthinkable that an attempt was made to deceive the government, as the integrity of the companies who submitted the costs was beyond possible question, and the prices fixed on the coarse numbers of yarn were too low, while on the finer numbers it was the opposite. This would seem to indicate that the manufacturers had no comprehensive knowledge of their real costs, and that the wide fluctuations were not due to intentional deception. The real reason was undoubtedly due to failure to differentiate costs by yarn number—an almost chronic failing among manufacturers.

"This was forcibly impressed upon me at the meeting in Washington, for among all of the manufacturers who attended, there were but two who could give comprehensive manufacturing cost by *number* of yarn. All of the rest gave a manufacturing cost based on the average yarn number. This indicated that their total labor and expense for a given period had been divided by the total pounds of yarn produced, arriving at an average cost per pound.

"At the present time, due to demand and high prices, absolute costs are not necessary, but the period of reconstruction is at its peak, and no one can tell how soon the demand will fall off, with the resulting close competition. When margins of profit are close, it is of the utmost importance to the manufacturer to know the exact cost of each manufactured article, so that he can endeavor to let his competitor take the lines that in his own mill would be unprofitable, and himself manufacture the articles showing a fair profit. A spinning mill is usually considered to produce one article of manufacture, "yarn," but have you ever stopped to think that yarn covers a multitude of separate and distinct finished articles, comprising carded, double carded and combed yarns of all numbers and twists?

"A machine shop would not dream of obtaining costs by dividing their total labor and expense by the total pounds of machinery produced. Such a method applied to a yarn mill will give a more accurate result than in the case of the machine shop, but will certainly not give an accurate cost, in any sense of the word. Therefore, the need of differentiating cost by yarn number is of utmost importance to the yarn manufacturer.

"The correct and accepted method used by many of the Mohawk Valley manufacturers is to divide the mill into manufacturing departments, and to treat each department as a plant in itself. Thus each department must carry its own share of taxes, insurance, depreciation, power and other indirect charges, as well as the direct expense items, such as non-productive labor, supplies, repairs and so forth.

"The department expenses are set up as shown on the expense analyses in Fig. 1. The speeder department being taken as an example.

"The usual departments into which a yarn mill should be divided are as follows:

"*Opening and picking.*—The total labor and expense should, in this department, be divided by the total pounds of cotton opened. All numbers of yarn are to bear the same cost.

"*Carding.*—Total labor and expense should be divided by the total pounds of combed cotton produced; all numbers of yarn again bear the same cost.

"*Drawing and slubbing.*—The total labor and expense is divided by the total pounds produced, all numbers of yarn to bear the same cost.

"*Speeder.*—In this case the total labor and expense is to be divided by the total *unit pounds* produced, this resulting in a cost per unit pound. The yarn number here takes identity. On the finer H. R. it takes a longer time to produce a given weight than for the coarse H. R., and may take one, two or three processes, according to the fineness of the finished roving desired, which in turn is

dependent upon the number of the yarn to be produced. Therefore it will be found to cost more per pound to produce the finer hank rovings for the fine yarns than it does to produce the coarse rovings for coarser yarns.

"In this department is used what is termed the 'Unit Method.' Actual production tests must be taken on the speeders for the different rovings arriving at the time necessary to produce a given weight for each hank roving. A set of units is then compiled for the different numbers of yarn, in proportion to the roving used to produce that number of yarn, and the time necessary to produce a given weight of each roving. The units are in proportion to the producing time and therefore must be in proportion to the cost.

"From the spinning report, we obtain the total pounds produced for each number of yarn, which are multiplied by their respective speeder units. The sum of these totals gives the total unit pounds produced. Divide the total department expense and the total speeder productive labor by the total unit pounds, obtaining a labor and expense cost per unit pound of yarn, as illustrated in the expense analyses, Fig. 1.

"To obtain the speeder cost for a given number of yarn, multiply the cost per unit by the unit for that number of yarn. The tables show an illustration of the unit method:

SPEEDER UNIT TABLE.

YARN NO.	TIME TO PRODUCE 100 LBS. OF ROVING	UNIT
15s to 18s First speeded at 1¼ Hank	57 Min.	
Next " " 3¾ "	189 Min.	
TOTAL	246 Min.	1.00
13s to 14s Speeded at 3¾ Hank....	189 Min.	.77
10s to 12s Speeded at 2½ Hank....	97 Min.	.39
8s to 9s Speeded at 2 Hank.....	64 Min.	.26

speeded to 3¾ hank roving which requires 189 minutes for 100 lbs. Therefore the speeding operations for 15s to 18s yarn takes 57 minutes plus 189 minutes which equals a total of 246 minutes.

"The roving for 13s to 14s yarn is speeded at only 3¾ hank, which from the speeder tests, requires 189 minutes per hundred pounds. In the same manner we determine the time necessary to speed the rovings for all numbers of yarn.

"We will take 15s to 18s yarn as the base or unit of 1.00. These numbers of yarn take 246 minutes of speeder time per 100 lbs. of yarn. If we divide the time necessary to speed each number of yarn and divide it by 246 we will arrive at the set of units in the table that are in exact proportion to the time necessary to speed the different numbers of yarn, for one of the first rules of arithmetic

SPEEDER DEPARTMENT PRODUCTION TESTS.

MACHINE NUMBER	HANK ROVING	TIME START	TIME STOP	TOTAL SPEEDING TIME	GROSS WEIGHT PRODUCED POUNDS	WEIGHT OF BOBBINS POUNDS	NET WEIGHT PRODUCED POUNDS.	TIME PER 100 LBS.
12432	3.75	11.25 A. M.	4.03 P. M.	3 Hrs. 38 Min.	216½	101	115½	189 Min.
12426	2.50		Calculated.					97 "
12133	2.00	1.04 P. M.	2.30 P. M.	1 Hr. 26 Min.	256	122	134	64 "
12124	1.25	11.50 A. M.	2.50 P. M.	2 Hrs.	371	160	211	57 "

"The method of taking the speeder department tests is best explained by taking as an example the test on 3¾ hank roving in the foregoing table.

"When the speeder has been doffed and empty bobbins placed on the machine the time of starting is taken, which in this case was 11.25 A. M. After the machine is next doffed the time of starting is again taken, in this case it was 4.03 P. M. The total time of 3 hours and 38 minutes represents the elapsed time between the starting time and finishing time including doffing of the frame. The full speeder bobbins taken from the frame are weighed, totaling 216½ lbs. From this total is deducted 101 lbs., which equals the weight of an equal number of empty speeder bobbins. This leaves a total of 115½ lbs. of 3¾ hank roving produced in 3 hours and 38 minutes. The total time is divided by the total pounds of roving produced and multiplied by 100 which gives the time necessary to produce 100 lbs. of 3¾ hank roving.

"Similar tests are taken for all of the hank rovings. In fact several tests should be taken for each and averaged, for there is considerable fluctuation in production of different speeder frames.

"This speeder unit table is developed from the table of speeder tests. To make 15s to 18s yarn the roving from the slubbing frames must first be speeded to 1¼ hank roving, which as shown by the speeder test, requires 57 minutes for 100 lbs. The 1¼ hank roving must then be tells us if we divide a set of figures all by the same number we do not change them in proportion one to the other.

"Next let us apply the unit method in actual practice to develop speeder cost.

YARN NO.	UNIT	LBS. ACTUALLY PRODUCED	UNITS
8s	.26	3575	929
10s	.39	94	37
11s	.39	110460	43079
16s	1.00	103147	103147
Total Pounds Produced		217276	
Total Units Produced			147192*

"In the foregoing tabulation Col. 1 represents the numbers of the different yarns spun. Col. 2 represents the speeder units obtained from the speeder unit table. Col. 3 represents the actual pounds of yarn produced for a month of each number of yarn. Col. 4 is the pounds of yarn spun in (Col. 3) multiplied by the speeder units of Col. 2.

"If we have the total labor and expense cost of the speeder department for the month and divide that total by the total unit pounds of yarn produced, we arrive at the speeder labor and expense cost per unit pound. This is illustrated below.

Total Speeder Dept. Labor and Expense...$3,014.02
Total Unit Pounds Produced 147,192*
Labor and Expense Cost per Unit .....$.0205

Now for the result:

Yarn No.	Cost Per Unit Lb.		Speeder Unit		Actual Cost Per Pound
10s Carded	$.0205	×	.39	=	$.0080
16s Carded	$.0205	×	1.00	=	$.0205

"Note the huge variation between numbers, all of which is ignored in the ordinary pound distribution method.

"*Spinning.*—Total labor and expense are here divided by the total unit pounds produced; the result is again a cost per unit pound.

"The procedure in this department is the same as that used in the speeder department, except that the tests must be made on the spinning frames and a set of units developed in proportion to the time necessary to spin a given weight of each number of yarn.

"*Winding.*—The total department expense is here divided by the total productive labor. The result is a percentage of expense to productive labor. Winding is almost invariably done on a piece work basis, which gives the labor cost for each number of yarn without further complications. By applying the percentage of overhead to the piece work price, we obtain the total winding cost.

"A compilation of a yarn cost is illustrated by the yarn cost card, Fig. 2. On this form you will notice that the cost is developed step by step, as the raw cotton is processed, and developed into finished yarn ready for shipment.

"The cotton waste must be taken into consideration in figuring the material cost and also in the processing. In this case the percentage of waste amounted to 14½ percent of the gross weight of the cotton opened. In other words, it took 117 pounds of raw cotton to produce 100 pounds of finished yarn.

"Today many are taking time by the forelock and instituting proper cost finding methods. Their prices will differ according to the efficiency of their production methods; but the spinners will know the real cost, and will be in a better position to control their sales, and take orders on the most profitable kinds and numbers of yarn."

Keeping Employees at Work.

Your ability to keep your employees working steadily is the barometer which registers the volume of business you are producing, your future prospects, and whether or not your plant is a complete success.

Much has been said for and against the system of premium advertising. By that we mean the use of a profit-sharing or prize coupon system in connection with retail sales. It is only recently, however, that the premium coupon proposition has been applied to manufacturing plants. This was, we think, originated by the Garnet Carter Company of Chattanooga, Tenn., who have installed the system in a number of manufacturing plants including several knitting mills. The simplicity of the plan is perhaps its greatest asset.

When installing this system with a manufacturer an illustrated catalog is furnished without cost to each of his employees and the certificates or coupons are sold to the manufacturer at a price of 50 cents each. Naturally the employees take the catalogs home with them and there is always some member of the family who immediately becomes interested in securing a sufficient number of certificates in order to obtain some certain premium. Inasmuch as these certificates are given to the operatives by the mill managements only for full time work each week, it is evident that the interested persons, whether wife or daughter, will do anything in their power to get the worker to put in full time.

Experience has shown that the employees will work more steadily to secure certificates than they will for money. If money is given them in the form of a bonus, they feel that they are not being properly paid otherwise the employer could not afford to give them a bonus and they frequently complain because the amount of the bonus is not added to their regular wage. The pysehology of the certificate plan is that they are getting something other than money, they are getting something for nothing, and when they have obtained the desired premium, because they feel that they have gotten something for nothing, they naturally exhibit it to their friends among the employees with a great deal of pride and satisfaction. The natural reaction is to interest other employees, who were at first indifferent, to the point where they become enthusiastic over the certificate plan.

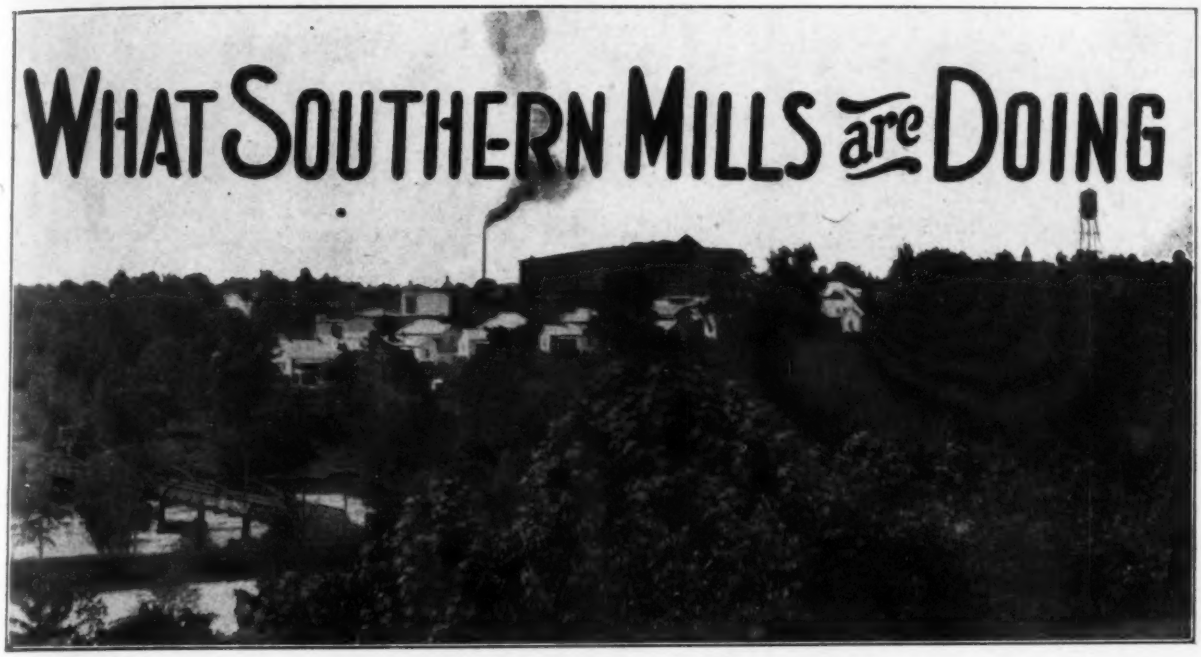
Investigation among some of the users of this plan indicate complete satisfaction. W. B. Davis, president of W. B. Davis & Sons, of Chattanooga, Tenn., and Fort Payne, Ala., is using the plan and likes it. At the Park Woolen Mills at Rossville, Ga., they were very enthusiastic and said that 85 out of 125 workers get a coupon each week. Mr. Wilson, secretary and treasurer of the Richmond Hosiery Mills at Rossville likes the proposition very much, and Mr. Probasco, president of the Union Cotton Mills at LaFayette, Ga., said he was using the plan with much success. It is also being used successfully in such mills as the Sweetwater (Tenn.) Hosiery Mills, the Ashe Hosiery Mills at Knoxville, Tenn., the Knoxville (Tenn.) Knitting Mills Company and the Loudon (Tenn.) Hosiery Mills.

Anyone who has seen the diversified collections of soap coupons, tobacco coupons, savings certificates and other prize and premium getting papers accumulated by the average housewife can at once realize how easy it will be to secure the aid of the wives of the employees in overcoming the evil of uncertain work hours. Johnny's excuse that he wants to go fishing or Pa's touch of lumbago will fall on unsympathetic ears if Ma has set her heart on a new parlor table or a cedar chest and the chances are that the excuses will not be accepted.

Eliminating the trouble of screw holes wearing out by the constant removing and replacing of screws, Stine brass screw holes can, in addition, be used without damage to the receiving material in any place a screw can be used, say the manufacturers, the Stine Screw Holes Co., of Waterbury, Conn. Being made of brass, these screw holes will not rust under adverse atmospheric or moisture conditions and no special screws are needed as they fit any machine screw now in stock.

Smith & Furbush Machine Company, Hancock and Somerset Streets, Philadelphia, Pa., has issued a 16-page catalog containing illustrations and descriptive matter of the new 30-inch cylinder garnett machines manufactured by this company.

WHAT SOUTHERN MILLS are DOING



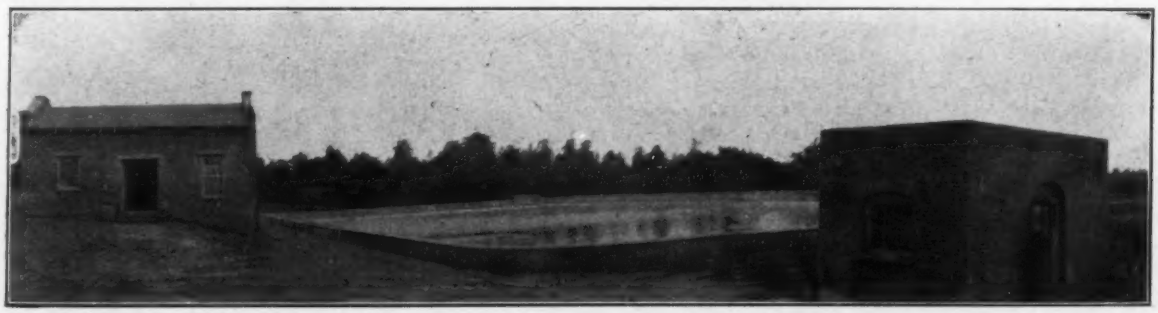
THE MILL AND VILLAGE AT WARE SHOALS, SOUTH CAROLINA.

The Ware Shoals Manufacturing Co., at Ware Shoals, S. C., has all the attributes of a typical southern mill. It is located on the banks of the Saluda river at a point that was formerly known as Ware's Shoals, from the man who owned the property and operated a grist mill on that site. Later the name was changed to Ware Shoals after the present development of the property had begun. Being located off the main line of any railroad, it was necessary for the company to establish its own branch railroad between Ware Shoals and the Southern railroad at Shoals Junction. The interurban service of the Piedmont & Northern electric road also connects with this branch at Shoals Junction. Like many other southern mills, being thus situated in comparative isolation has necessitated the entire plant being placed upon a self-contained basis, with the result that the mill is surrounded by the numerous auxilaries that are necessary for the health, the comfort, the education and the prosperity of the people of the village.

An entire article of considerable length might be written upon this one subject, but as this department is devoted to the doings of many mills, the space available will allow only an indication of the principal outstanding points that strike a visitor as being somewhat unusual either in the method of handling or the completeness of detail.

Primarily the water power induced the building of the mill and the power house as at present developed contains four large alternating current generators driven by water wheels. A brief glimpse of the power house and penstocks is shown in the illustrations. Arrangements are now in progress for building a re-inforced concrete bridge, the contract work being in the hands of the John W. Ferguson Co., of Paterson, N. J. In this connection it is interesting to note that the Ware Shoals Company owns and operates its own rock quarry and stone crusher for preparing stone for this and other work around the property as well as for road work within its domain.

Among the new buildings now in process of construction is an ice and refrigerating plant which will be equipped with a 15-ton Triumph ice machine and which will contain cold storage rooms with a capacity of two cars of meat. This building is also being constructed by the Ferguson Company as is a large boarding house for the



THE RESERVOIR OF FILTERED WATER FOR RESIDENTIAL USE.

use of the operatives. The engineering work of all the improvements is in the hands of J. E. Sirrine, of Greenville, S. C.

Adjacent to the mill plant is a ginnery containing eight gin stands and equipped in the most modern manner. With this plant they are ginning 3,500 to 4,000 bales of cotton per year. Adjoining the ginnery is a cotton seed oil mill, also owned and operated by the company, equipped with ten linters and three presses and with a capacity to crush approximately 5,000 tons of seed per season. This mill is also the last word in up-to-date equipment, compressed air being used to clean the machinery and automatic scales being used to weigh the seed and the cotton seed meal, the latter scale automatically filling a bag with the required amount of meal and then stopping until a new bag is inserted beneath its spout.

Close by the oil mill with its oil tanks and meal house is located a small grist mill for local grinding and producing 150 bushels of meal a day.

Directly connected with the mill is a modern steam laundry equipped by the American Laundry Machinery Co., of Cincinnati, where the clothes from the homes of the villagers are washed and ironed ready for use at an average cost to the consumer of six cents a pound. This laundry is also equipped with the National Booth system of the National Marking Machine Company for sorting and marking the laundry. It was interesting to note that one corner of the laundry department was equipped for sponging and steam pressing men's clothing.

Another department of this big business is a general store which handles everything that the villagers may need for their comfort and convenience from sewing needles to stoves and from talking machines to fancy groceries. This store is strictly departmentized and the store records, which were readily thrown open to the writer, show exactly the results obtained from each department of the business from month to month with a surprising annual total of more than $700,000. A particularly interesting feature in connection with these store figures, especially in these days of the high cost of living, is that the profits made on the several departments barely cover operating and investment expenses, the latter being a moderate interest charge.

The market is separate from the store proper and is entirely screened on the inside so that the butchers and the meat upon which they are working are enclosed in a wire cage. Adjoining the market in a small separate building is a complete shoe and harness repairing equipment with experienced men in charge.

Before we get too far away from the main store building let us refer to another item that is well worth attention at present as showing the prosperity of the people who live in this village. Adjoining the main offices of the company is the Bank of Ware Shoals which is also operated by the mill. The 13th annual statement of this bank, issued at the close of business on January 31, 1920, showed deposits amounting to $648,223.68. This shows a growth over the three previous years as follows: Deposits January 31, 1919, $375,690.84; 1918, $265,680.13; and 1917, $176,003.59.

The schools of Ware Shoals use 11 teachers and are thoroughly equipped with the essentials for this work including the two large playgrounds, one for boys and one for girls. However, the school buildings proper have reached the point where they are too small to accommodate the children of the village to the best advantage and plans are being made for the future construction of a much larger and very complete school building.

The town supports its own baseball club and brass band of 27 pieces known as Riegel's Concert Band. It has a skating rink and also a large building known as the People's Amusement Hall. This hall is completely equipped with pool and billiard tables, bowling alleys and a large gymnasium, adjoining which are shower baths which are being fitted up in white tile, the former cement concrete finish not proving satisfactory. On another floor of this building is a large auditorium with a stage and several sets of scenery. This auditorium is also equipped with two motion picture machines, regular shows being given therein. On another floor of this building is a large combination lodge hall for the several secret orders, and adjoining this hall are several smaller rooms, which are kept carefully locked, in which the regalias, the goats and other initiation equipment for the secret orders are kept. Adjoining these rooms is a ladies' rest room, a kitchen equipped with the necessary furnishings and a small banquet hall.

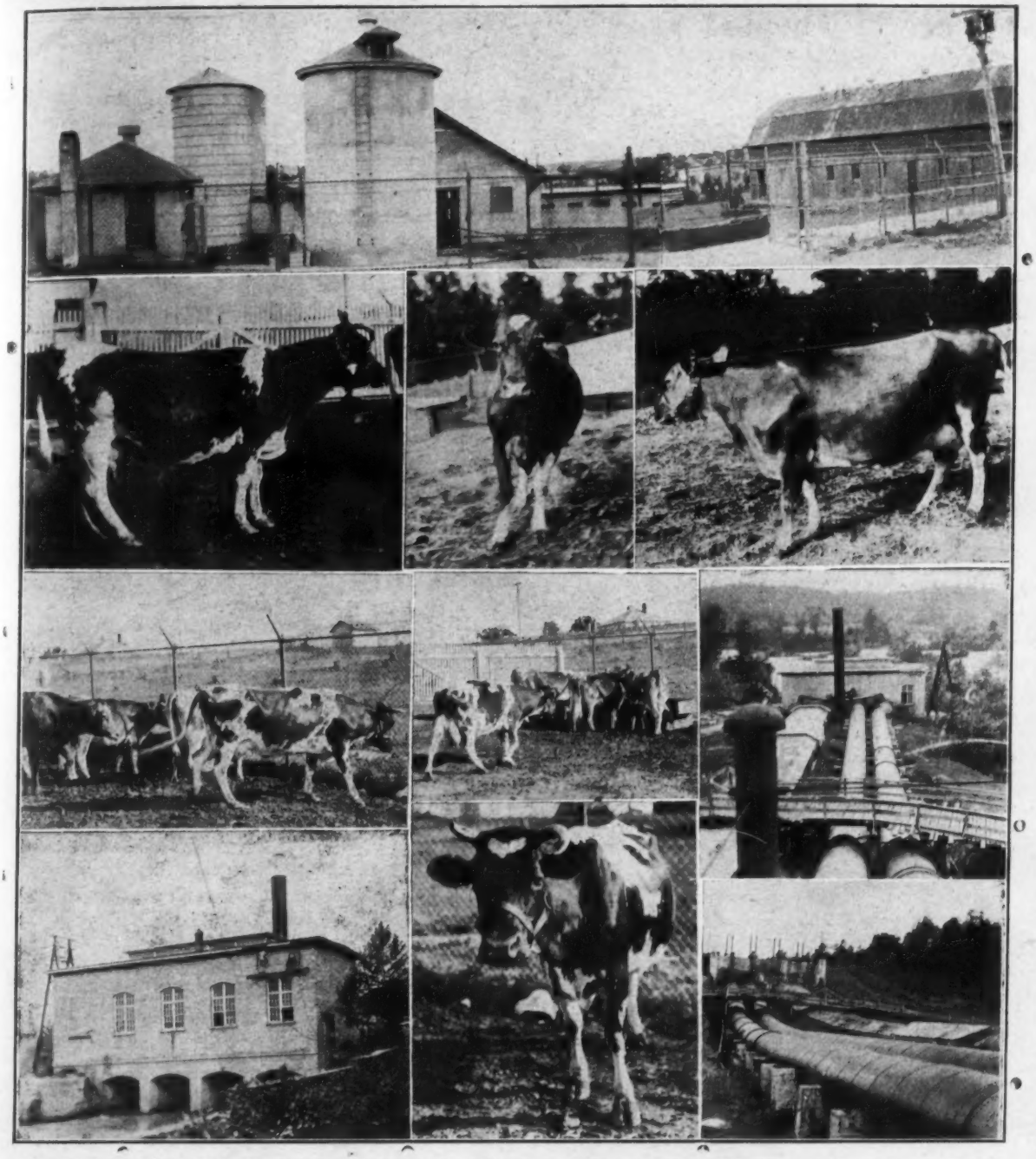
Water for domestic purposes is furnished the village from the reservoir shown in the illustration. This water is pumped from the river to the filtering basins where it is suitably treated and chlorinated then flowing into the storage reservoir shown. From this point it is pumped into an elevated steel tank in order to secure suitable pressure to deliver it to all the houses in the village.

Another unique feature among the auxilary equipment at this mill is a dairy equipped with high class Guernsey stock all of which are registered. There are at present about 50 cows, 10 calves and 5 bulls in the equipment and in accordance with the practice in high class dairies of this character the product from each cow is weighed daily and a record kept so that each cow stands on her own merits. An especially interesting feature in connection with this dairy work is that all the milk from the dairy is sold to the villagers at 20 cents a quart.

About 400 acres of farm land belonging to the company are now under cultivation principally for growing feed for stock keeping purposes.

Another innovation at this plant is the use of woven steel wire fence upon different parts of the property rather than the use of the old time wooden fence. In the South it is becoming the usual thing to use this steel fence around the mill proper but at Ware Shoals they not only use the fence around the mill but they have a similar fence around the children's playgrounds, one around the dairy, one around the filtered water reservoir and filtering plant and even a large part of the street fences on the company farm are of steel wire. The village cemetery has a wire fence and experiments are being made with the use of a similar wire fence of considerably less height around some of the village houses. At the time of the writer's visit erecting men from the Anchor Post Iron Works of New York were engaged in enclosing the tennis grounds in wire netting.

The streets of Ware Shoals village are, to a large extent, concrete while concrete curbs and gutters line many other streets that are not yet paved. As soon as the village is completely sewered they anticipate laying still more concrete roads.



TOP—THE DAIRY AT WARE SHOALS. CENTER—SOME OF THE CHOICE GUERNSEY STOCK. LOWER LEFT—THE POWER HOUSE WITH ITS BIG ELECTRIC GENERATORS. LOWER RIGHT—TWO VIEWS OF THE FORE BAY AND PENSTOCKS.

So far this has been a story of a cotton mill with no mention being made of the mill. However, the Ware Shoals Company have two mills that are being very successfully operated and undoubtedly one of the reasons for this success lays in the spirit which the workers put into their work. In going through the weave rooms of these mills, for example, the visitor will note large flags displayed over the benches of some of the loom fixers. These read "The Best Section;" "The Second Best Section;" etc. and the superintendent of weaving advises that these flags reldom remain over the same bench for two successive periods. It's like any other sporting trophy, no sooner does a man win it than his numerous competitors immediately begin striving to take it away from him and some of them usually succeed. It is this friendly spirit of rivalry, this treating the work as a game, as a sport, that is undoubtedly doing much to aid the morale of the employees and increase the production of the mills of this company.

Endorsement to the 55-hour week and of a general industrial policy of education, both of labor and of consumer was given at the 17th annual convention of the

Cotton Manufacturers' Association of South Carolina, which came to a close at Asheville, N. C., on June 12. The resolution passed by the American Cotton Manufacturers' Association favoring an increase in freight rates for the southern lines was also adopted at this meeting.

Dr. Henry N. Snyder, of Wofford College, Spartanburg, S. C., addressed the association on education. Neils Christensen, of Beaufort, S. C., spoke on the aims and purposes of the South Carolina Development Board. Dr. Sniveley, of Converse College, Spartanburg, S. C., and Prof. Doggett, of Clemson College, S. C., both addressed the meeting along educational lines, the latter telling briefly of the textile educational feature of the institution with which he is connected.

The following officers were elected: President, James D. Hammett, Anderson, S. C.; Vice-President, A. F. McKissick, Greenville, S. C.; Secretary-Treasurer, Robert W. Sullivan, Anderson, S. C.

Of general interest to cotton manufacturers is the fixation by the North Carolina Cotton Manufacturers' Association and the State Corporation Commission of a scale for the tax assessment on mill properties in that state which was effected recently. In a letter sent to the members of the association by the secretary, it was stated that the State Commission had set a rate of assessment that would tax spinning mills on a basic rate of $65 per spindle and weaving mills on a basic value of $85 per spindle. However, under strong protest from the mills throughout the state, said the letter, these figures have been lowered.

On the new basis, spinning mills will be assessed upon a basic valuation of from $30 to $40 per spindle and weaving mills on a basic valuation of from $37.50 to $57.50 per spindle. These figures will be depreciated 3 per cent per year for the first five-year period, 2 per cent per year for the second five-year period, and 1 per cent thereafter, with a maximum depreciation of 40 per cent, except in special cases.

The City Cotton Mill Company, of which E. S. Shelby is president and F. L. Newby treasurer, expects to start production next October. The new company's plant will be equipped with 5,000 spindles, manufacturing 40s to 60s cotton yarns. It is capitalized at $500,000.

The Duncan Mills, Greenville, S. C., it is reported, will erect a new mill for the preparation of silk goods.

The Tucapau Mill, Spartanburg, S. C., has made application for an amendment to its charter to allow an increase in its capital stock from $300,000 to $1,076,000.

An increase from $2,500,000 to $4,000,000 in its capital stock is asked by the Monarch Mills, Union, S. C., in an application filed recently for an amendment to its charter.

The Riverside & Dan River Cotton Mills, at Danville, Va., have let contracts for 100 new operatives' houses which will be built as rapidly as possible, this program representing an ultimate investment of approximately $500,000. Fully $6,000,000 worth of building is going on in Danville at the present time or is immediately contemplated, it is reported. There is more construction work actually going on in the community than at any other time, the reason for this being that during the war building operations stood still and many projects then schemed are now assuming material shape.

The capitalization of the Borden Manufacturing Co., Goldsboro, N. C., has been increased from $300,000 to $2,000,000.

The Dacotah Cotton Mill, at Lexington, N. C., will, it is reported, erect a two-story, 192 x 54 foot, addition for spinning and slasher rooms.

The Victory Spinning Company has been incorporated at Maiden, N. C., with a capital stock of $600,000. The incorporators include H. S. Robinson and Lewis Rudisel of Lincolnton, N. C., and G. W. Rabb of Newton, N. C.

The stock of the Stonewall (Miss.) Cotton Mills Company has been acquired by Oscar Berman, president of the Crown Overall Manufacturing Co., of Cincinnati. By purchasing this stock, the new owner of the mills also comes into possession of the entire town of Stonewall, including all the houses, buildings, stores, the theatre, schools, hotel, 1,100 acres of land, all in addition to the two large textile plants. The new owners will take charge on September 1, but it is stated that no changes will be made in the management of the mills.

Another transfer of property in which almost a whole town was involved was the purchase of the Bowen-Jewell Company, at Jewell, Ga., by Joseph E. Gant, of Burlington, N. C. The deal included the cotton mills, operatives' houses, real estate and other property, the only part of the business which was not bought by Mr. Gant being the cotton and a large stock of merchandise in the company store. This property, said to be worth from $300,000 to $400,000, was owned by the W. L. Bowen estate, D. A. Jewell, J. B. Cody and A. S. Bowen.

Brandon Mills, Greenville, S. C., will build a new 8,000-spindle duck mill, 132 x 265 feet, to be two stories, of standard mill construction. They will also erect a two story warehouse, 100 x 100 feet, and a steam power plant.

Report has it that the Courtenay Manufacturing Co., has been sold to the Issaqueena Mills, of Central, S. C.

Among the southern mills who have recently increased their capital stocks are the following: Clifton (S. C.) Manufacturing Co., from $1,000,000 to $2,000,000; D. E. Converse Co., Glendale, S. C., from $500,000 to $1,000,000; Marlboro Cotton Mills, McColl, S. C., from $1,500,000 to $3,000,000; Saxon Mills, Spartanburg, S. C., from $300,000 to $1,000,000; Eureka Cotton Mills, Athens, Tenn., from $150,000 to $300,000.

The mills of the Coosa Manufacturing Co., Piedmont, Ala., are to be doubled in size and capacity and construction has begun on an addition thereto. It is stated the enlargement will add between 500 and 1,000 employees to the company's payroll.

The Floyd Cotton Mills, Rome, Ga., have been sold by H. F. Jones to the Echota Cotton Mills, at Calhoun, Ga., and will be operated by the new owners as Echota Mills No. 2.

The Lauderdale Cotton Mills, Meridian, Miss., are installing 285 new looms.

Having increased its capital stock from $30,000 to $50,000, the Louisville (Ky.) Textile Company will add 30 looms to its present equipment.

It is reported that the Alexander Manufacturing Co., Forest City, N. C., will erect a new two-story mill, 250 x 80 feet, to be equipped with 13,000 spindles. Electric

power will be used and 40s to 80s combed yarns will be manufactured.

The Enterprise Mill, at Augusta, Ga., has let contract for the erection of six 4-room houses to cost about $2,500 each.

The Belk Mills Company, Charlotte, N. C., has been issued a charter, to engage in the manufacture of textiles. The capital stock is $250,000 and the promoters include W. R. Belk, E. F. White and J. G. Parks.

The Vance Cotton Mills, Salisbury, N. C., are erecting an addition which will add 15,000 square feet to the present manufacturing floor space.

The Maginnis Cotton Mills, New Orleans, La., are installing additional picker room equipment.

The Arcade Cotton Mills, Rock Hill, S. C., have purchased 6,500 additional spindles, says a report.

The consolidation of the Couch Mills Co., Atlanta, Ga., the Beaver Duck Mills, Greenville, S. C., and the Beaver Cotton Mills, Thomson, Ga., into one organization to be known as the Couch Cotton Mills, Inc., has been announced. The headquarters and general offices of this corporation, which has a capital and surplus of approximately $2,500,000, will be in Atlanta. Its officers are: W. D. Couch, president; L. J. Powers, vice-president and secretary; Walter T. Candler, treasurer; Asa G. Candler, Sr., chairman of the board of directors. The directorate, in addition to these officers, includes A. P. Coles of Atlanta, A. F. Townsend of New York City, and B. M. Graves of Charlotte.

The mills involved in this transaction make a wide range of fabrics which include light weight drills, beach cloths, filter twills, wide, sail, army and heavy belting ducks, etc., and cover a large field. All the mills are in full operation day and night. It is stated that many improvements and extensions are being planned and will be announced from time to time. The company maintains its own sales offices at 320 Broadway, New York City, which are in active charge of A. H. Penfield.

It is reported that the Brandon and Poinsett Cotton Mills, at Greenville, S. C., have made arrangements to purchase the two stores of the Gordon Mercantile Company in the villages of these mills. It is planned, says the report, to operate the stores without profit, selling goods and supplies to the operatives at cost.

The Barnhardt Manufacturing Company, at Charlotte, N. C., is erecting a $45,000 addition of brick and concrete construction to the mill.

A recent addition of 2,000 spindles increased the equipment of the White-Parks Company's mill at Concord, N. C., to 4,000 spindles.

The Grasselli Chemical Co., Dyestuff Department, 117 Hudson Street, New York, announce they have taken over the sole selling agency of the Essex Aniline Works, Inc., 88 Broad Street, Boston, and stocks of Essex products, in addition to those made by the Grasselli Company, will be carried at all the branch agencies of the Grasselli Company. The Essex technical staff will remain intact and will collaborate with that of the other company.

The New England Mill Situation.

Reaction in trade is now beginning to be felt among the New England cotton mills in various ways. Mills are beginning to catch up with their back orders, operatives are showing less desire to find fault with their jobs, and the new and higher costs of labor are contracting the profit margin. Selling agents are unable to get the high prices goods commanded a short time ago. Some cancellation of business on the books has been forced and when operatives talk of vacations no effort is made to restrain them.

Conditions in the cotton mills are so very much better than those in the woolen and silk mills in this section that the hesitation now seen is not considered discouraging. The break down in the woolen industry has caused a sharp decline in the goods used in making wool garments, so that twills, sateens, and special lining cottons, are to be had at much lower prices in the markets, and fewer new orders are heard of. The collapse in the silk trade has brought about a much sharper competition between silks and fine cottons and the latter are also adversely affected by the importations. In the past ten months over 100,000,000 yards of English and Swiss cottons have been imported and they come in direct competition with many goods made in this section.

On the other hand, the severe drop in the price of spun silk, and fine cotton yarns, makes for a better prospect for next spring on silk and cotton goods, especially of a novelty or fancy character. It will be possible to meet the lower price trend that is now so general in retail channels. Fortunately in some ways, a four-weeks' strike in New Bedford mills curtailed deliveries of many fine goods for this season and helped to clear the decks of surplus goods this summer.

At the end of the third week in June the Textile Alliance gave notice that lists of many German dyes wanted by the yarn and cloth dyers will be available and importations will be possible under the rules laid down by the government in trading with Germany. This is expected to relieve the strain of the demand for fast dyes of special shades, and especially many that are wanted in yarn dyeing and printing. Some manufacturers say it will enable the mills to offer more yarn dyed fancy cloths in the future, and particularly those styles fast to bleaching and much wanted for their beauty and salability.

Manufacturers are much disturbed by the poor cotton crop outlook. From all that is stated here, the high price of cotton due to the certain scarcity, will have a powerful effect in holding prices relatively high in the goods markets. Some manufacturers are inclined to regard the outlook as very much more menacing than the speculators paint it, for the reason that the length of the season will be against a full growth of the long staples, now so much wanted. The setback in fine mercerized yarn markets is not expected to be prolonged as the scarcity of the staple will be a corrective of large importance taken in conjunction with the actual shutting down of machinery when spinning orders run out.

Secretary Rufus R. Wilson of the National Cotton Manufacturers' Association, who is also the secretary of the World Cotton Conference to be held in Manchester

next June, recently arrived from England where he spent six weeks in the textile districts. He states that English manufacturers look upon the last government cotton report as one of the most calamitous features of the after-war recovery in the trade. The need for cotton will be large and the character of the carry over from the current crop will be poor. He found many of the Manchester men of the opinion that cotton prices will be very high even if financial pressure this fall becomes severe.

The closing down of silk and woolen mills has had the effect of increasing the operatives available for the cotton mills. It has also assisted materially in changing the attitude of the radical union workers toward the prospects for steady employment. A prolonged doffers' strike that was fought by the Fall River manufacturers ended in the complete defeat of the strikers. At New Bedford, where many of the mills were closed four weeks by a strike of loomfixers, the strikers returned beaten. In Rhode Island, three or four sporadic attempts to inaugurate strikes in the mills came to nothing. The change in the employment outlook is having the normal effect of making workers more reasonable, and in the next few months it is believed it will assist in increasing the output.

The general attitude of manufacturers in this section has been to check advances and to absorb the last wage advance in the profit margin. But this policy has not yet impressed converters and others. They have been entering into active discussions as to costs of production and have been pointing to the exceptional dividends of mills to show that prices must be lower. Until there is some radical decline in costs manufacturers say there cannot be as drastic a price revision as that seen in silks, or threatened in woolens. Roughly speaking the only concessions thus far have averaged about 10 or 12½ per cent from the extreme top.

One of the largest lines of dress ginghams priced for spring, 1921, was offered on a basis of about the current market prices, or a level of 37½ cents for Toile du Nord, and 35 cents for Red Rose of Lancaster. Orders were placed promptly by the jobbers with the understanding that if an advance over these prices becomes necessary buyers will be free to revise their orders at the time the higher price is named. There has been little or no revision of orders in ginghams of any kind.

When the cotton mills advanced wages June 1, the finishing companies were forced to follow suit. Nearly all of them gave notice at once of an advance in the costs of finishing, varying from 5 to 7 per cent. The U. S. Finishing Company did not follow but made advances only on a few lines. This action has unsettled the converters again and because of the quiet trade in their finished lines they are not ordering in goods. At the same time the finishers are still quite busy on old orders for which goods are now being transported more regularly. It is one of the noticeable things in the transportation situation in this section that orders for goods placed within a short time have been delivered promptly while many of the goods ordered months ago are still undelivered. Recently it was stated that goods are again beginning to come through from the South in about two weeks.

The outlook for machinery has changed greatly in consequence of the financial conditions in the Far East. Many orders for machinery for Japan and China may have to be delayed although payment has been provided for to the extent of the work done to date. The panic and drop in silver have completely changed the immediate conditions in China, India, and Japan, and the reaction here is being felt. Some orders for goods to be shipped there have been compromised by the agents and some goods have been offered for resale in this market. In machinery circles it is said that unless some further trouble develops in financial circles in this country, the hesitation abroad will enable machine shops to undertake better deliveries for machines wanted badly in this country for repair and other purposes.

The letting down of the shoe industry has caused dullness in shoe lining fabrics. In that quarter it is again a question of too high cost of labor in shoe making, and an inability on the part of shoe manufacturers to cut prices until the labor conditions change. As in some other lines a short period of idleness may help toward an early correction.

There has been considerable apprehension expressed concerning the probable effect of a further financial pressure on business if it extends to the automobile trade. There are some very large unfilled orders on the books of cotton mills making special fabrics for rubberizing and other companies and any serious unsettling of this business would be far reaching. Thus far the effects have been negligible. A more serious matter is the continued dullness in the garment making trades where business has been quiet this spring and where it is now apparent that further contraction may be looked for. A great many cotton goods have been cut up for outing purposes in connection with automobiling in the past year of frenzied luxury buying.

The boom in mill shares has ended for the time being at least. The decline has not been severe but many shares are now offered that were unobtainable early in the year at prices from $20 to $25 a share higher. Dividends disbursed have been the largest ever known and there has been some extension of the policy of expanding capital stock. But the stage has been passed where buying is attracting an outside and speculative public.

Trade has been unsatisfactory with hosiery and underwear mills and some of the larger plants are quietly cutting down their product. The consuming public has not been willing to pay the high prices for many of the standard lines of knit goods while the manufacturers have been subject to the influences of very much higher wages and very high costs for yarn. At this time the yarn markets are easing and it is hoped that before the middle of August the present uncertainty will have passed.

In New England, a republican stronghold, the nominations of Harding and Coolidge have removed doubts as to the safety of the market from a business standpoint. Both men are high protectionists and that means much to most New England cotton manufacturers.

Mother Necessity is raising a family. Besides her first offspring, Invention, she has another—Economy.

Just because many great men have a pet hobby is no argument in favor of trying to attain prominence by riding a hobby.

Barrett Specification Roofs

Bonded for 20 and 10 Years

Why we dare give a Surety Bond--

FOR many years we have backed up our belief in Barrett Specification Roofs with a Surety Bond guaranteeing these roofs to be free from repair or maintenance expense for at least 20 years. We are often asked how we *dare* give such a Bond.

The explanation is simple. We know from 60 years' experience that roofs made with Barrett materials and built according to the detailed directions of The Barrett Specification will greatly outlast the 20-Year guarantee.

We do not lay roofs ourselves. That is always done by a roofing contractor. We have therefore, no motive for cheapening the job or passing as satisfactory any faulty construction. On the contrary, it is to our interest to see that every bit of material is of the grade specified, that all of it is used, and that it is used properly.

Furthermore, there can be no temptation for us to permit the construction of a roof that will give *just* the 20 years of guaranteed service, for we must have a liberal margin of safety beyond that 20 years.

This means that we are going to see to it that you, as a building owner, get all that you pay for —not only for *your* protection, but for our own as well.

Barrett Inspectors watch every Bonded Barrett Specification Roof during construction to see that the specified materials are used and that they are properly applied.

As a further precaution, after the roof is laid, and before the final surfacing of gravel or slag is added, a Barrett Inspector makes an Inspection Cut for every 25 squares of roof area, as shown by photographs at bottom.

After the cut sections have been replaced and covered by an equal number of layers of pitch and felt, the final surfacing is applied to the whole roof—75 pounds of pitch covered with a protecting layer of 400 pounds of gravel or slag to every 100 square feet.

Important Notice

The Barrett Specification, Type "AA" 20-Year Bonded Roof represents the most permanent roof-covering it is possible to construct, and while we bond it for twenty years only, we can point to many roofs of this type that have been in service over forty years and are still in good condition.

For those who wish a somewhat lighter and lower priced roof-covering, we recommend the Barrett Specification Type "A" Roof bonded for 10 years.

Both roofs are built of the same high-grade waterproofing materials, the only difference being in the quantity used.

Photograph shows the first step of the test cut, to which every Barrett Specification Roof guaranteed by us is subjected.

The Surety Bond is offered on all Barrett Specification Roofs of 50 squares or over in all towns of 25,000 population or more, and in smaller places where our Inspection Service is available. This Surety Bond is issued by the U. S. Fidelity & Guaranty Co., of Baltimore, one of the largest surety companies in America.

Our only requirements are that The Barrett Specification *revised April 15, 1920,* shall be strictly followed and that the roofing contractor shall be approved by us and his work subject to our inspection.

Full details regarding these Bonded Roofs and copies of The Barrett Specification free on request.

The Barrett Company

New York	Chicago	Philadelphia	Boston	St. Louis
Cleveland	Cincinnati	Pittsburgh	Detroit	New Orleans
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Syracuse	Seattle	Peoria	Atlanta	Duluth
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Note the thickness of this heavy, water-proof blanket. After the piece of roofing has been replaced and the cut covered by an equal amount of material, 75 lbs. of pitch, a protecting layer of 400 pound of gravel or slag is applied to each 100 square feet.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, June 21, 1920.

Figuring lower than the lowest of private returns, the first monthly crop condition report of the season, issued on 2nd. inst., was the lowest on record for that period of the year, averaging only 62.4 vs. 75.6 last year, 82.3 year before last, 69.5 in 1917 and the ten year average of 78.7.

A redeeming feature of the Bureau report was noted in the revision of last year's estimated acreage of 33,960,000 acres; the revised figures showing that last year's area was 35,133,000 acres, of which 33,560,000 were picked, returning a yield per acre of 161.5 pounds vs. 159.6 year before last and 159.7 in 1917.

While the market bulged sharply after the government figures were issued, the advancing tendency of values was checked by extensive realizing, influenced by expectations that the weather would likely improve and because of an unfavorable view of outside conditions.

At that time the world was confronted by the official statement that the American crop was making the poorest start in history, by confirmatory advices that labor is scarce and dear, and that the acreage is about the same as last year's on which a crop of only about 12,000,000 bales, including linters, was produced, whereas the condition of the plant, as of date May 25th, was 13.2 points lower than on the corresponding date one year ago.

However, the weather in the interior has been more favorable the past month, and advices from the country are to effect that improvement, in some instances a distinct improvement, notably in Texas and Georgia, has taken place, making the outlook for the growing crop more promising than it was last month, and it is to be hoped that the improvement will continue, as the world will likely need a large crop for next season.

The consumption of American cotton by the world this season is estimated from 12,500,000 to 13,000,000 bales, and as Europe is gradually getting back to normal, it is only reasonable to expect that the world would consume more of American cotton next season, if the staple is available.

Compared with last year the condition of the crop on May 25th by states was as follows: Virginia, 71 vs. 89; North Carolina, 70 vs. 85; South Carolina, 68 vs. 78; Georgia, 55 vs. 81; Florida, 62 vs. 75; Alabama, 58 vs. 78; Mississippi, 65 vs. 73; Louisiana, 72 vs. 74; Texas, 60 vs. 76; Arkansas, 61 vs. 68; Tennessee, 60 vs. 64; Missouri, 64 vs. 70; Oklahoma, 70 vs. 65; California, 86 vs. 91.

The next monthly government crop report will be issued on July 2nd and while it is generally expected to show marked improvement compared with last month, there is uncertainty as to whether the acreage of this year will show a decrease or an increase compared with one year ago. The consensus of opinion is that it will figure about the same as last year's area.

Against the making of a large crop this year is the presence of the weevils over a greater area than ever before for as early in the season, and in larger numbers than last year, especially in Texas. Except for periodical needed rains during the growing and maturing periods, hot, dry weather will be necessary to keep the pest from becoming destructive.

Up to last Friday, compared with last season, exports from the U. S. to Europe were 6,119,000 bales against 4,685,000, the South marketed 11,635,000 vs. 10,912,000, and spinners took 11,319,000 vs. 9,454,000, leaving stock at all ports 958,000 against 1,345,000, and at 30 counted interior towns 836,000 vs. 987,000, while the world's visible supply of all kinds was 5,514,000 vs. 5,066,000, of which 3,492,000 was American against 3,382,000, of which only 1,793,000 was in the U. S. vs. 2,333,000.

On the basis of a commercial crop of 12,000,000 bales, the South has yet to market about 3,274,000 compared with 3,479,000 last year.

Sentiment remains moderately bullish but cautious, as there has been no improvement of consequence in the spot demand in the South, which has ruled slack for several weeks past, due to the scarcity of white cotton. When new crop cotton is available, a decided improvement in the demand is looked for.

Allen Machinery Corporation Organized.

In order to meet the present strenuous demands from cotton mills operating on tire fabrics and tire cords, there has been designed a thoroughly modern ball bearing twister frame. This design was not the product of any one individual but the cooperative work of a number of men well versed on cotton spinning and twisting machinery.

A twister frame of 132 spindles, 5½″ ring, 7″ gauge, 8″ traverse was built from this design and is now in daily operation at the plant of a large machinery manufacturer near Boston. This frame is equipped throughout with anti-friction bearings of the highest grade and is using Allen twister spindles.

A new corporation was formed in Providence, R. I., to exploit the manufacture of these twister frames as well as to continue the design of others.

Also the important subject of suitable twister rings was investigated and it was decided that improvements in the quality of steel and workmanship were necessary to meet the present demands for increased speeds from modern twisting machinery. Alloy steel was found to be most suitable because a very high polish and wear resisting properties could be obtained.

The art of ring manufacture and the study thereof by the help of Swedish steel engineers, who came to this country to manufacture ball bearings, has been of great assistance in producing a high speed common vertical twister ring. The manufacture of these rings has been entered into, so that the mills may have a source of supply for these rings.

Therefore it is believed that this new organization, known as Allen Machinery Corporation, with headquarters at 80 Boylston Street, Boston, Mass., with Edward G. Lyon as treasurer and general manager, and Arthur R. Petterson as secretary and mechanical engineer, should be able to provide for the tire fabric mills a most satisfactory line of twisting machinery, orders for which are now being accepted for delivery this year.

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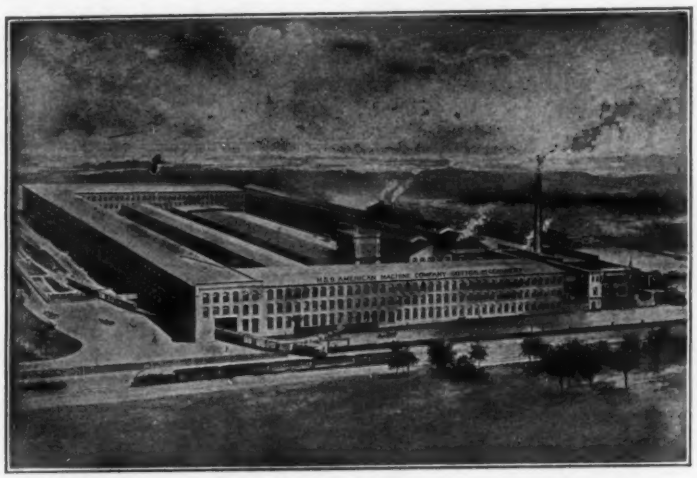

Spinning Room Machinery

Twisters for Wet or Dry Work

With Band or Tape Drive

H & B AMERICAN MACHINE COMPANY
PAWTUCKET, R. I.

Formic Acid.

Formic acid is a useful material in the dyeing and tanning industries, but other competing acids have, as a rule, been cheaper and the use of formic acid has therefore been restricted to a few cases for which it has peculiar advantages. It is chiefly of inferest because recent technical advances in its manufacture indicate that when normal industrial conditions are restored, it may be put on the market at a lower price, which should greatly broaden its market. These new discoveries will probably indirectly have a marked influence also on the manufacture of oxalic acid.

Formic acid when concentrated is a corrosive, fuming, colorless liquid with a characteristic and irritating odor. It solidifies at 8 degrees C., and has a boiling point almost identical with that of water. It mixes with water in all proportions and appears in commerce in strengths varying from about 50 per cent up to almost 100 per cent. It is a stronger acid than acetic acid, which it resembles most closely, and has antiseptic properties. Formic acid produces a painful sore when brought in contact with the skin. The irritation caused by the sting of bees and wasps is believed to be due to the minute amount of formic acid secreted in the wound. Its alkali salts are reducing agents, particularly at high temperatures.

The textile industry can use formic acid for many purposes. In the dyeing of cotton and wool mixtures in acid bath it is said to be superior to sulphuric acid because it is less injurious to cotton than sulphuric acid. It is also used as a mordanting assistant in dyeing wool with a chrome mordant, for which purpose it competes with tartaric, oxalic, and lactic acids. It may replace acetic acid for many purposes in the textile mill whenever the price may justify it.

Formic acid forms salts with all metals, but the most important derivative is sodium formate. It is the material from which formic acid is made and is also used as a catalytic agent in the hydrogenation of oils. Many different forms of nickel are used for this process, but it is claimed that the formate has many advantages and a large and growing use is indicated.

The earliest method of making formic acid was by the distillation with water of the bodies of certain varieties of ants. The name of the acid is derived from this source (*formica*, Latin for ant). Formic acid was next made by heating together oxalic acid and glycerine, but the acid made in this way was too expensive to find wide use. The development of the Goldschmidt process, by the Germans, reduced the cost of formic acid considerably and made it possible for the industry to grow rapidly. This process consists in heating carbon monoxide (or a gas rich in carbon monoxide such as producer gas) with caustic soda, under a pressure of about 10 atmospheres, and at a temperature of about 200 degrees C. This results in a direct combination, yielding sodium formate of a high degree of purity. The sodium formate may be treated with an acid (sulphuric acid or niter cake) and distilled, yielding formic acid. An even more important development is the conversion of the sodium formate into sodium oxalate and also into oxalic acid.

Efficiency is not a mysterious thing; it is the result of steady, earnest application to one's work.

EVEREADY

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Change of Shade in Artificial Light.

BY PAUL V. RESENVELT.

Everybody who comes in contact with dyed fabrics is aware of the fact that sometimes two samples of dyed fabrics are the same shade in natural daylight, but entirely different shades in artificial light. This is especially very common in blues, and almost everyone has noted how often a blue suit or dress of a good color in natural light changes in shade in artificial light to a dirty purple color.

For the dyer this change of shade is of the utmost importance, especially for the worker in a job dyehouse. If, for example, a dyer should match a lot to the original sample in daylight, and if this lot were then used for the sleeves of a dress, the rest of which had been made out of a previous lot, it might happen that even though the sleeves and the rest of the dress matched almost perfectly in daylight, in artificial light the sleeves might show the complementary color; for example, purple, while the other part showed a greenish blue.

This change of shade is especially important in the dyeing of silk and wool, but naturally in some cases it is also important for other fabrics such as cotton and paper, etc.

If the original sample was dyed by the same dyer, it will be relatively easy for him to duplicate the original, but if the original sample was dyed somewhere else the dyer then will have a difficult task. It is then important to know how every dyestuff made by direct fabrication will change its shade in artificial light when in combination with other colors.

The following are the rules for the different dyestuffs:

1. Red Dyestuffs—The bluer a red in natural light the greater tendency it will have to appear redder in artificial light.

2. Yellow Dyestuffs—The more orange or red a yellow in natural light the greater the tendency to appear greener in artificial light.

3. Blue Dyestuffs—The more red a blue in natural light the greater tendency it will have to appear redder in artificial light.

4. Orange Dyestuffs—Orange which is a very yellow red or a reddish yellow will tend to appear green in artificial light.

5. Green Dyestuffs—Green which is a very yellow blue will tend to appear greener.

6. Violet Dyestuffs—Violet which is a red blue or a blue red will tend to appear redder in artificial light.

But these rules are only true by comparing two dyed fabrics of the same shade; for example, comparing sample A with sample B.

Sample A is dyed with a greenish yellow + bluish red + reddish blue. Sample B dyed with a reddish yellow + yellowish red + greenish blue.

Samples A and B show the same shades in daylight, but under electric light sample A is much redder than sample B, or sample B much greener than sample A.

To demonstrate further the importance of the change of shades, a very specific case from my own experience may be quoted.

A lot of almost 220 pounds of carpet yarn was to be dyed by a job dyer a brown shade, which was very rich in yellow. In the sample book a brown was found which was almost the same shade, but not as yellow. The dyer, therefore, changed the formula a little and dyed the lot with 0.4 per cent Patent Blue, 0.8 per cent Sulphon Orange G and 0.6 per cent Aliz. Rubinol R, and ruined with this combination the entire lot, as it had in artificial light a green tone, while the original lot was in artificial light a cerise red. After various sample dyings in the laboratory, a new lot was dyed with a difficult combination which was 4 per cent Sulphon Yellow R and 1.2 per cent Wool Fast Violet R, this matching the original sample in every kind of light, and was the only combination which did so.

It is a fact that two dyed samples might match perfectly at 10 o'clock in the morning, while at 4 P. M. they show quite a difference, and in every such case it will be found these samples will show almost the same difference in artificial light.

It is also a fact that the human eye varies in its sensitiveness to colors, and some dyers are able to see in natural light the same differences as two samples would show in artificial light, while other dyers might see just the contrary difference.

A few years ago while I was working for a dyestuff manufacturer two dyeings of a light drab shade were made which matched each other perfectly in daylight, but showed different colors in artificial light.

In one case the following combination was used: 0.065 per cent Fast Light Yellow G; 0.055 per cent Aliz. Saphirol B; 0.1 per cent Orange I B, which matched as perfectly as possible, with another combination as follows: 0.31 per cent Fast Light Yellow G; 0.043 per cent Aliz. Saphirol; 0.12 per cent Azogrenadine S. Very little difference could be seen between these two samples, but the last sample looked a trifle redder to the writer. Then 14 colorists were asked to tell the difference between these two samples, with the following result: 4 could not see any difference at all; 6 saw the same as the writer—No. 2 sample a trifle redder than No. 1 sample; while 4 more saw just the reverse, namely No. 2 greener than No. 1.

This experiment, together with others, proved to us that the majority of dyers will see the same difference in daylight as in artificial light, but that the majority is not such a great one as might be expected.—*Color Trade Journal.*

"Textile Markets of Argentina, Uruguay and Paraguay" is the title of a report just issued by the Bureau of Foreign and Domestic Commerce. The countries considered in this volume form the most important field in South America for the efforts of American manufacturers of textiles. Textile exports from the United States to Argentina increased from $312,000 in the fiscal year 1913 to $18,814,000 in 1918, giving the United States second place as a supplier of textiles to that country. Shipments to Uruguay increased from $46,000 to $1,048,000 during the same period.

But to be successful a manufacturer considering this trade must know the class of goods in demand, the competition to be met, how to pack, obtain credit reports, etc. These important factors are all fully discussed in the report referred to, which also has appended a list of samples submitted with this report. A copy of this book may be secured by writing to the Superintendent of Documents, Government Printing Office, Washington, D. C., and enclosing 20 cents in coin or money order.

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L-511

Chile as an Export Market.

BY ERNEST L. LITTLE.

The country of Chile is one of the most peculiarly shaped of any in the world, extending some 2,600 miles along the west coast of South America and having a width of only 90 to 250 miles. Lying as it does between the mountain tops of the Andes and the ocean and extending so great a distance from north to south, it embraces a wide range of climate. All the northern part down about to Coquimbo is a most arid and desolate desert, without rain and vegetation while the irregular land south of the Chacao Channel, between the island of Chiloe and the mainland, is practically uninhabited by whites. Here the hardy Chilean peasants, or rotos, the descendants of a vigorous race of Indians on the one side, and the Spanish conquistadores on the other, have extensively developed agriculture and stock raising and have formed what is said to be the most homogeneous nation in South America. The population of Chile is 3,415,060.

The wealth of the country is derived from the barren, and rainless provinces in the North where the large nitrate fields are extensively developed. Upon the condition of this industry, rests the prosperity of the entire country and the dependence of Chile on the nitrate fields is shown by the fact that, although export duties are levied only on nitrate of soda and iodine, the sum received from these is almost double that from import duties.

Cotton goods form the largest single article of import into Chile. During prewar years Great Britian monopolized about half, the remaining amount being supplied by Germany, Italy, France and the United States. The war, however, created an economic advantage for the American exporter, and the Chilean buyers failing to obtain their requirements from other countries turned towards the United States for their purchases.

The Chilean statistics of the imports of cotton and its manufactures fail to give a thoroughly clear idea of the demands of the market even though they are listed in detail. Owing to general classifications, it is not possible to ascertain the relative amount of piece goods imported that are printed, colored, unbleached and bleached. The largest item contained in the statistical report is goods for clothing which includes all goods destined for clothing of which about $2,500,000 worth are imported annually. The next classification in size is that of white goods amounting to $1,000,000.

The demand for print goods in Chile is less than that of the other South American countries in proportion with the total imports and this has been attributed to the influence of the prevailing religion. The women are regular attendants at the numerous services and for church attendance black is the only color considered appropriate. As a result every Chilean woman, regardless of her station in life, dresses in black. Only among the Indians and in the country districts are colored goods used to any great extent.

The largest single item in the import list is white shirtings most of which are made with rather a stiff finish, the English shirtings being 64 by 60 to 84 by 84 constructions and in widths of 28 to 35 inches. Some of the best selling white shirting is of a soft finish.

There is also a market in Chile for napped goods of all kinds and owing to the climate printed flannelettes are in demand most of which are 28 to 30 inches wide, some being made with dyed yarns, but the larger portion are printed. Colored goods of all kinds, ticking, sheetings, blankets and handkerchiefs are also imported in large quantities.

When merchandising textiles in Chile, the American exporter should give special attention to the preparation of sample books and all measurements should be expressed in the metric system. The idea of continually converting English dimensions into the metric system does not appeal to the average foreign buyer. English and German sample books are designed to meet the special requirements of each country.

In order to secure proper representation in Chile, it is necessary to secure a native house as agent with an office in Valparaiso which is the chief port and commercial center of the republic, with an enormous shipping traffic, the greatest percentage of imports being received through this city. The agent should also have an office in Santiago, a short distance from Valparaiso. This is a larger city than Valparaiso and from these two it is possible to cover the entire republic by commercial travelers.

In shipping goods to Chile great care must be taken in packing the merchandise and careful consideration should be given to the fact that there will be little care shown in handling and that thefts from cases are frequent on the west coast of South America. Provision against pilfering is necessary especially in shipments of textiles. Various methods have been recommended, among which may be mentioned the use of tongued and grooved lumber for boxes; strapping of cases and boxes with steel bands; the use of wire drawn around each end and the middle of the case so tightly that it sinks into the wood at the corners, the ends of the wire being twisted and cut close with nippers and the use of safety clips of various kinds to bind the top and bottom of the case to the sides.

The proper marking of export shipments to Chile is important as proper packing, as mistakes in marking are very costly to the importer, who frequently has to pay large fines for these errors. The instructions of the agent should be carried out to the smallest detail thus preventing many costly mistakes.

Notes About Men You Know.

J. S. CARPENTER, formerly superintendent of the Indian Creek Mill, at Lincolnton, N. C., has accepted the position of general superintendent of Maiden Cotton Mills No. 2, which was formerly known as the Providence Cotton Mill.

J. LAWRENCE IVERS, superintendent of Renfrew Mill No. 6, Adams, Mass., was chairman of the Old Home Week celebration which was held in conjunction with the Adams High School Alumni Association, during the week of June 28 to July 5 inclusive, under the auspices of the Adams Chamber of Commerce. The program included band concerts, aerial stunts, fireworks, ball games, etc. There also was a society circus, a hose race, merry-go-round, and Punch and Judy shows. The celebration, under Mr. Ivers' direction, was a complete success.

Notes About Men You Know.

LEFT TO RIGHT: JOHN F. PORTER AND JAMES A. GREER.

N. C. ROE, for several years superintendent of the Lincoln Cotton Mills, Huntsville, Ala., has resigned and will go to Tulsa, Okla., to become general manager of the new Pioneer Cotton Mills.

J. M. ARCHER has been elected president of the Daniel Morgan Mills, recently chartered at Charlotte, N. C.

HERMAN F. STRAW has resigned as agent of the Amoskeag Manufacturing Co., Manchester, N. H., after serving in that capacity for 35 years. He will, however, be retained by the company as general consulting engineer and thus his services will be obtainable at all times. Major William Parker Straw will succeed his father as agent of the concern.

R. S. MONTGOMERY is general manager of the new finishing plant of the P. H. Hanes Knitting Company, at Reidsville, N. C.

G. D. BARLOW has resigned as superintendent of the Dillon (S. C.) Mills.

PERCY W. ELLIS, formerly connected with several eastern mills, has been made assistant superintendent of the Anderson (S. C.) Mills.

GEORGE L. KINNETT has been made general manager of the Willingham Mills, at Macon, Ga., succeeding Broadus Willingham. Mr. Kinnett was formerly superintendent of the plant.

E. S. TRAMMELL has been appointed superintendent of the Keowee Yarn Mill, Walhalla, S. C.

HENRY GRAYSON, formerly overseer of spinning at the Hawthorn Mills, Clover, S. C., now has a similar position at the Manchester Mills, Rock Hill, S. C.

J. W. JOLLY has accepted the position of superintendent of the Autauga Cotton Mills, at Prattville, Ala. He was formerly located at East Point, Ga.

S. T. GREEN is now overseer of spinning at the Cochran (Ga.) Mills.

L. C. LOVELL has been promoted to the superintendency of the Dillon (S. C.) Mills.

GEORGE A. GULLEDGE has resigned as spinning overseer at the Griffin (Ga.) Manufacturing Co.

R. H. LAYTON has resigned as overseer of carding at the Gibson Mfg. Co., Concord, N. C., to become overseer of carding for Mills Nos. 1 and 2 at the Anderson (S. C.) Cotton Mills.

G. LYNCH succeeds George L. Kinnett as superintendent of the Willingham Mills, Macon, Ga.

PAUL F. HADDOCK, the southern manager of A. Klipstein & Company, with headquarters in Charlotte, N. C., left on July 8, together with Mrs. Haddock and their son, Paul, Jr., on the S. S. Olympic for England, where they will visit Mr. Haddock's parents. Mr. Haddock and family expect to be back in this country about September 15.

J. R. FEDERLINE, JR., overseer of spinning at Drayton Mills, Spartanburg, S. C., has resigned that position to accept a similar one with the Darlington (S. C.) Manufacturing Company.

ERNEST NELSON has been appointed manager of the Selma (Ala.) Manufacturing Company.

L. O. ERWIN has been made superintendent of the Huntsville (Ala.) Knitting Company.

J. J. HURST has become superintendent of the Hamilton Carhartt Cotton Mill No. 4, at Mobile, Ala.

C. D. GOODROE has succeeded N. G. Mauney as superintendent of the Ozark (Ala.) Cotton Mills, according to a report. Mr. Mauney goes to the Pinckard (Ala.) Cotton Mill Company in a similar capacity.

KAY LAWSON has been succeeded by Harry Winn as superintendent of the Hutcheson Manufacturing Co., Banning, Ga.

CLYDE C. COBB has been made manager of the Montgomery (Ala.) Cotton Mills.

L. C. LANGSTON has succeeded J. L. Shinn as superintendent of the Rainbow Manufacturing Co., at Ozark, Ala.

J. L. CHANNELL has been appointed superintendent of the Madrid (Ala.) Cotton Mills.

W. H. SAUNDERS has become superintendent of the Crawford (Ga.) Cotton Mills.

ALFRED A. THOMPSON, president of the Raleigh (N. C.) Cotton Mills, died suddenly at his home in Raleigh recently. He was well known in southern cotton mill circles, having been especially active in the affairs of the Cotton Manufacturers' Association of North Carolina of which he was at one time president.

W. W. COBB, formerly overseer of spinning at the Monarch Mills, Union, S. C., has gone to the Norris Mills, Cateechee, S. C., as superintendent of their plant. Jesse Nichols, formerly with the Pacolet Mills at Trough, S. C., succeeds Mr. Cobb at the Monarch Mills.

C. L. BRADLEY has succeeded M. E. Pitts as general overseer of carding and spinning at the Forsyth (Ga.) Cotton Mill.

J. T. HULL, lately assistant superintendent at the Cherokee Falls (S. C.) Manufacturing Co., has returned to the position of overseer of carding at the Phoenix Mills, Kings Mountain, N. C.

T. W. STONLEY has been made overseer of weaving at the Stonewall (Miss.) Cotton Mills.

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a chance on a lucky packet, but you do not use that method in business.

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The System Staff of Ernst & Ernst is a staff of recognized experts in practically every line of commercial endeavor. It is, indeed, 22 System Staffs, operating through offices in 22 cities and offering, individually and collectively, a service long and widely recognized in the work of establishing ***efficiency in business organization.***

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STRAIGHT LINE METHODS

How Other Men Manage

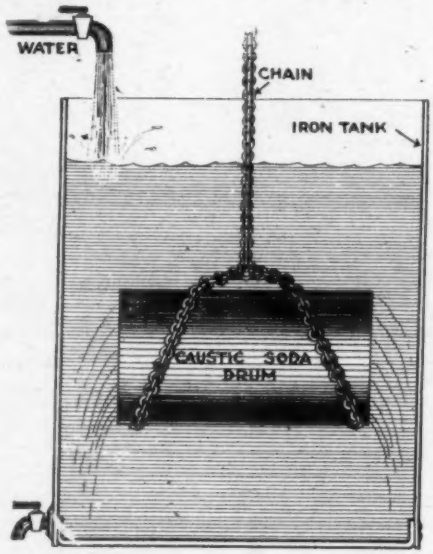
Practical Discussions by Cotton's Readers on all varieties of Mill Subjects

Dissolving Caustic Soda.

EDITOR COTTON:

In the April number, on page 414, I see a very interesting question and the reply thereto entitled "Dissolving Caustic Soda." Upon studying the drawings I find that a steam pipe is made to blow its jet of steam directly in the open downward end of the drum of caustic soda. I have seen this method used in some mills but I am taking the liberty of sending you a sketch of a dissolving drum that I have seen in other mills.

From an examination of this sketch you will see that an iron tank is provided with an outlet pipe for the contents of the tank located near the bottom; also a water inlet pipe at the top. The drum of solid caustic soda is broken open at each end, the drum suspended by a chain is hung in a tank of warm water and almost overnight the contents will be completely dissolved without the use of steam. In the morning the empty drum may be hoisted out of the liquor and thrown away.



It has occurred to me that this drum or tank might serve the purpose of your correspondent where he might not have the other facilities shown.

L. J. Matos (N. Y.)

Nashville Hardwood Flooring Co., 3622 S. Morgan St., Chicago, is sending out a little booklet on hardwood flooring for homes, stores and factories, which answers a large number of the questions that prospective buyers want to know about before deciding which kind of flooring is best adapted to their particular use. It is illustrated, showing the colors of the different woods so that the effect of the product, when finished, can be seen.

Production from a Spinner's Standpoint.

EDITOR COTTON:

I shall endeavor in this letter to give you a few suggestions from my own personal experience in regard to increased production. There has been a time in my cotton mill life when a machine could be run at its maximum speed and then some, so far as the help question was concerned because there were plenty of workers and an operative could be given just as much work as he or she could do at the high rate of speed. But when the wear and tear of the machinery were taken into consideration, it was found that the mill was losing money.

Human nature is just about the same today as it always has been and when a worker is given more work to do than he thinks he is getting paid for, it matters not if circumstances do force him to do the work, he is going to slight something in some way that will cause some part of a machine to wear out, for the want of oil, for instance, thereby stopping the machine and losing production. Some may say, "Oh, we pay by the piece. We have the piece work system throughout our mill." Yes, I know that can be and is true in a great many mills but I would like to be shown one mill that has the piece work system that does not allow the operatives the production of the machine when it is broken and standing for repairs. The piece work system is all right if handled in the correct way, but I have my first one to see which is handled right. The machines are usually kept running whether or not the work is being turned out. The clock may show production when probably there is not over 75 per cent of the stock going through the machine.

I have seen all these modern devices but I have never seen one yet whereby the help could not learn in a very short time to beat the mill. If the operatives in any concern are allowed to get it into their heads that their employers are trying to trick them or force them into some thing unknown to them, they are going to set in then and there to "beat the mill at its own game" and nine times out of ten they will do it. These high speed fanatics are going to the wall as fast as they can.

There is only one satisfactory way by which I have been able to get production. For instance, Draper says number 21s warp should have a front roll speed of 138. That is too high. Some other fanatic says number 21s warp should be 100 turns for the front steel roller. That is too low, but there is a happy medium say, 120, between the two extremes and if we find it and adopt it we will be o. k. So after I get this medium I proceed as follows:

I get some intelligent men for second hands and section men and teach them that they are the hank clocks. In my opinion, a man who can't walk through his room two or three times a day and tell whether he is getting production is not much of an overseer. I give my spinners just

as many sides as they can keep cleaned and keep the ends running. My doffers are given as many frames as they can doff and have nearly as much rest as they have work, and can doff in a hurry when they do doff. I have as many as four to a set, and never less than two to a set and in this way, there is not much time lost on doffing.

I keep an extra steel roller or two, if necessary, an extra set of pulleys, and two or three extra belts on hand at all times. I also keep extra gears in stock in case some being used should wear out or break. I have those things in operation looked over occasionally and if any of them are wearing out I have them changed after stopping time, thereby preventing a break down and loss in production during running hours.

I contend that a first class overseer who is not bothered by the office is all the hank clock needed in a room. I know there are a lot of good overseers today who can't run their jobs because of some inexperienced superintendent, agent or president meddling with their affairs.

Every one knows that it is impossible to run a room or mill successfully without discipline. This does not mean that the operators must be brutal and overbearing, but that some good, common-sense rules must be adopted and carried out. I remember very well when the bars were let down and many working people ruined and there was no one to blame but the mill owners. It was in 1907 and 1908, just after the panic. The help were under good control, and while some superintendents and overseers went to the extreme and were cruel to the operatives, instead of the management curbing these and bringing them where they ought to be, they became uneasy and were afraid their mills would shut down and would tell their superintendents, "Don't be so tight, let up, let up" and the superintendents would tell the overseers the same thing.

Now, all men of experience know full well that it has always been just a few sorry hands who have had to be held in check and the mills have allowed these sorry ones to ruin a lot of good workers by letting them do as they pleased—this class of people never please to do right. I think that the mills that have a strict discipline and rules that are within the bounds of reason, and that carry out these rules, will have more help and will get a better quality and bigger production.

In other words, let the president hire a first-class superintendent, who should in turn get first class overseers, and then let each man run his own job and not meddle with the other fellow or be meddled with by him. If an overseer runs off some chronic grumbler and kicker who has about two good spinners, two good doffers, three good weavers and a card hand, the president and superintendent instead of looking like their grandmothers were dead, should, if they do anything, congratulate that overseer and encourage him for he has certainly done a commendable thing. Some may say that this has nothing to do with production, but it has. If a mill has a contented set of help and is paying them for value received, they are going to work for the mill's interests. If more of the mills would take some of this money that they are spending for non-essentials and put in on their operatives wages, I believe production would boom.

This question of production lies in the hands of the mill owners. When they come to the point where they will say to their superintendents, "We want you to run our mill at a fair profit, at the same time letting the help know that the more they make and the longer they stay with us, the more they will continue to make," then production will shoot up.

Then a mill won't need any democracy plan or committee plan. All that will be needed will be a good superintendent and good overseers who are given instructions to run their jobs on the square, and results will be secured. Ninety per cent of the cotton mill help do not want to have anything to do with the management of the mill and the ten per cent who do are generally the poorest help in the mills and the ones who give the most trouble.

In conclusion, I will present a layout which I think will give any mill its desired production. As I see it, a successful mill must have a president with good common sense, an experienced superintendent with self-control and overseers with experience and self-control who are given instructions to be in control of their respective jobs. The medium between the high and low speeds should be found and the work so planned that all repairs be made nights and Saturday afternoons. Machinery should be kept in good running repair so that the operatives will not have to work themselves to death, and will be well paid for what they do.

Now as proof of the doctrine I have been preaching I will state a few facts. I know of a mill of 25,000 spindles, 21s warp and 23s filling, and with 812 looms on 4 and 4½ yard weave. The spinning room in this mill had never been known to keep the looms running and I will say that that was some job. I was hired to run the spinning but I found that the spinners and doffers were not making what the weavers and card room hands could make. Therefore I told the management that I expected as much pay for my help as was paid to those in the weave room and the card room and I got it. I changed some of the speeds, some were too high while others were too low. After a few changes we had the work running good. Now those 25,000 spindles are running those 812 looms and the weavers are getting from 93 to 100 per cent production. I had no hank clocks, nothing but my second hand and section men, but those frames were kept running and there were no idle spindles. A machine running with no idle spindles, or bad running spindles to make waste, will give more production at a medium speed than a machine running at a high rate of speed with 10 per cent of idle spindles and 10 per cent of the ends down.

My motto is to treat my help just as I want to be treated and I expect the same treatment from them that I give them. To pay them well for their work, and then expect them to give me the work that I pay them for. I have tried this for a number of years and I have never failed to get results. I always speak to my help in the mill or out of the mill whenever I meet them and I believe that the majority of my help respect me and think well of me. Of course it goes a little hard with some of them having to live under a discipline of rules until they get acquainted. Then they like it. If all mills had good systems, it would not be so hard on the few that do have them.

Contest Letter No. 53. Cotton Spinner. (S. C.)

Your Money's Idle Hours

BECAUSE of the increased burden which war and resulting economic disarrangements have placed upon the dollar quicker turn-over of working capital is a most important factor in the financing of every business.

Payment of higher interest rates will not always secure funds. In a situtation where larger amounts are required for handling individual transactions and restriction of loans may be necessary to provide for essential activities, "*side-tracked credits*" are doubly undesirable.

A measure of relief comes when deliveries and collections are speeded up by reducing delays which even under normal conditions are often allowed to clog the processes of trade. To this relief, the Irving contributes by direct collections everywhere in America and by tracing shipments, notifying consignees of arrivals and presenting drafts by messenger daily in all parts of Manhattan. The *straight line to results* is the unfailing rule of Irving specialized service.

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Dustless Card Stripping.

EDITOR COTTON:

We can all find some consolation in the fact that this era of social unrest and labor troubles is bringing about improvements in our factory machinery which are, ostensibly, to make the work easier for the help but which also make better quality and larger quantity of production. The dustless stripping device applied to cotton cards stands among the more important of these modern improvements in textile machinery.

The card has always been considered the most important machine in the manufacture of cotton yarn, but it has always been the primary cause of the dirt and dust in the card room which has made the stripper's lot a hard one. Therefore, any device which will in any degree lessen the amount of dust and fly about the room will be welcomed by any superintendent who gives much thought to the welfare of his operatives. The dustless card stripper has now reached that point of perfection wherein it does the stripping in an economical and efficient manner. The writer has seen several of these stripping devices which are now on the market, but has had close relation with only one, which will be described in this article. This system may or may not be the best one on the market; the idea of this article is simply to call to the attention of the readers of COTTON that dustless or vacuum strippers are worthy of investigation by any mill man at the present time.

A few years ago I had the opportunity of visiting the mill which contained the second vacuum card stripper of this type ever installed in the United States and I then saw the device in its primitive state, the cylinder being stripped from the back and the doffer from the front, with a separate nozzle; the use of bands being employed to traverse the air nozzles across the cylinder and doffer. That device was stripping the card properly and was hailed as a wonderful device, just as the first automobile was. And like the automobile, this device has improved with time and is now more simple and compact.

A bracket is attached to each doffer shroud, about two inches in back of the front of the doffer bonnet. These brackets support a shell, inside of which is a shaft with a one-way traversing screw cut in it. On the left hand end of this internal shaft (if the card be a left hand drive) is a small gear which meshes into another gear, mounted on a stud on the inside of a gear cover which covers both gears. This gear cover rests on the top of the doffer gear cover and is capable of being lifted about an inch so that the gear driving the traverse shaft may be lifted from the doffer gear when the stripper is not in use. A small lever on the front of this gear cover provides for lifting or lowering it so the small gear drops through a slot in the doffer gear cover and meshes with the doffer gear.

In the bottom of the shell, which passes over the doffer cover, is a slot which exposes the traversing screw on the internal shaft. Mounted on this shell is a carriage which slides horizontally across the doffer. On the bottom of this carriage is a pawl, which engages with the traversing screw, but which can be disengaged by lifting the outer end with the hand, thus providing for sliding the carriage from the finish position in which it rests to the starting position. On the left hand bracket is a beveled piece of

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steel which lifts the pawl when the carriage has completed its trip across the card, thus serving as a stop motion.

Mounted on the carriage is a ¾-inch tube about 20 inches long which runs to the cylinder. A slot is cut in the front cylinder door about 1 inch high and the length of the door. A drop door is placed over this slot to prevent fly coming out when the card is running. The tube runs through this slot and lifts the door as it traverses, the door dropping back after the tube has passed. A hole the size of the tube is provided at the left end of this door so the slot is completely covered when the stripper is at rest. Another tube, flat and four inches wide, has a common outlet with the cylinder tube and runs to the doffer. The doffer nozzle is made four inches wide to expedite the traverse as the doffer travels so slowly. Thus, with a 40 inch doffer doing ten turns per minute, it will require one minute for the carriage to pass from the right to the left hand side of the card.

The junction point of the cylinder and doffer tubes on the top of the carriage is finished so that a 24-foot steel wound hose may be set upon it, the vacuum holding the hose on once it is put in position. A 2½ inch pipe line is passed through the room in such a position as to provide drop nozzles at convenient intervals for connecting the hose. This pipe line connects with the receiver which should, preferably, be placed in the waste house or in a separate room.

The receiver is a tank nine feet high with two chambers, the upper one being the larger and is the one in which the cotton is collected, the bottom one collecting the dust of the strips. A condenser of the usual style is placed on the top of the receiver and by this means the strips are cleaned and separated from the dirt and dust. The dust passes through the wire of the condenser cylinder and is drawn down a tube on the outside of the receiver to the lower compartment.

The pump, which extracts the air from the receiver and provides vacuum, is placed near the receiver and is mounted on a cement stand on the ground. It is driven by an eight inch belt from the counter shaft.

The operation of stripping the card is very simple. The stripper merely places the hose over the carriage mouth in which position the hose holds itself, then lifts up the pawl with his hand and pushes the carriage to the right of the card. He then drops the lever on the gear cover and the carriage starts across the card, the air drawing the cotton and dirt from the wire and leaving the clothing absolutely clean. When the carriage completes its trip it stops automatically and the stripper then lifts the lever, as it is useless to have the internal shaft running after stripping, takes the hose off and moves to the next card. Prior to stripping, the feed rolls and the calender rolls are stopped but the cylinder is left running. Only one card is stopped at a time, thus saving a large amount of production over the former method of stopping the cylinders on a whole line of cards as is done in some mills.

By the use of this modern method the strips are practically clean and are fit for mixing with the cotton in the opening room, or if they are sold for waste they bring a much higher figure than previously.

If the mill is large enough, one man does all the stripping and nothing else, the card tenders only putting on

laps and doffing cans thereby being enabled to run more cards per man.

A stripping system of this character is a valuable asset to any mill, and in consideration of the welfare of the operatives, if nothing else, something of the kind should be installed.

Wont some other card room men tell us their experiences with similar systems and other improvements?

M. W. H. (Mass.)

The Value of Modern Equipment.

EDITOR COTTON:

When a man faces what he must with a step triumphant and a heart of cheer, we call it courage. This is a feature possessed by the managers of all well-managed mills. These men succeed because they have the courage to carry out their convictions, and besides fighting their daily battles without fear, they are quick to give up an old idea for a new one.

There is a firmly fixed idea in the minds of many mill managers, who give the stockholders small dividends, that if the machinery shows little wear it is a saving to the mill not to replace it with new. There is no doubt that these men are honest, and the only reason that can be offered for their conceiving such an idea lies in the fact that they have not had enough practical experience.

The practical man is quick to replace old type machinery with new, simply because he knows that in a very short time the initial cost of making the change will be repaid in extra quality and quantity of the product. The outworn idea or machine must be pushed aside by the new one.

Of late years wonderful improvements have been made on the comber, drawing rolls, bearings. fliers, looms, shuttles and other machinery and parts. Still many cotton mills can be found that have not installed a piece of new machinery for the past twenty years. This prize contest which is being run in COTTON is sure to serve as a "sparker" to many mill men and I for one will try to prove that the use of old types of machinery is one of the causes of poor production in many mills.

Most mills vary little in the method of operation. The chief aim is a uniform thread. The speeds are usually obtained from machine catalogs, until a practical man makes such changes as he thinks best, and in this respect they vary little. We know, too, that dry spindle bottoms, different speeds from one frame to another, etc., cause loss in production, but the loss from all these factors is nothing compared with that sustained by the use of old types of machinery instead of new types. For illustration, picture a mill equipped with fly frames having 160 spindles. How can such a mill compete with another mill equipped with fly frames having 192 spindles? With the new frame, the running of the work will be improved to such an extent that the tender will be better able to take care of additional spindles.

Assuming that a four hank roving is run and 1,000 hanks turned off in each case weekly, we have $160 \div 4 = 40 \times 1{,}000 = 40{,}000$. With the new frame, not considering the extra amount of hanks that would be produced, we have $192 \div 4 = 48 \times 1{,}000 = 48{,}000$, or a difference of 8,000 pounds. This is only one of many cases that could be offered to show the difference in the value of mill shares.

We all know how unreasonable the help are at present; for this reason, the price per hank remains the same and the increased production is obtained without extra cost in the up-to-date mill while the mill with old type machinery suffers.

Let us now consider chain drives. The record of the chain drives used has been an enviable one. They will, as a whole, show up 98½ per cent efficiency and in some cases more. We get a very definite increase in production from the machines, on account of the positive speed ratio and the fact that the machine can be driven constantly at the most desirable speed, irrespective of surrounding conditions due to load variations, weather or the presence of more or less fly or dust in the air which affects other types of drives.

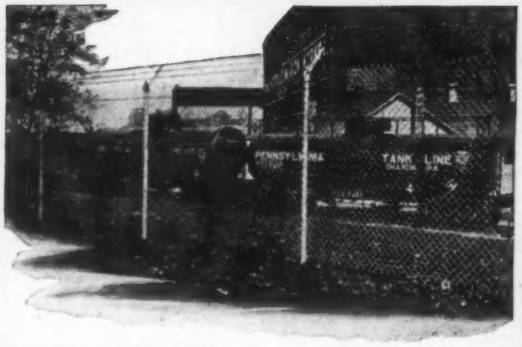
Next take up humidifiers. Think of the structure of the cotton fiber, its hollow spiral or collapsed tubular form, its delicate waxy walls and its wonderful adaptitude for drafting and twisting and manipulating under the proper atmospheric conditions, its refractory nature under adverse conditions of humidity and temperature, and its fretful disposition caused by the presence of static electricity. I have experienced cases in some mills where it was almost impossible to start all the cards on a cold morning, not only losing production but also making an unnecessary amount of waste. Humidifiers were then installed and turned on about an hour before starting time and afterwards no more of this trouble was ever experienced. Some people may say that the trouble could have been remedied by lowering the doffer comb. In the case in question, the doffer comb was at its lowest point and set to an 8-thousandths gauge and still the web followed the doffer.

It is unfair to demand from either carder or spinner in a mill not equipped with humidifiers, the same production that is secured in a neighboring mill which uses humidifying equipment. The higher the humidity in the yarn, the higher will be the breaking strength for the reason that the fibers in the yarn lay closer together as the humidity is increased, thus producing a more compact and less fuzzy yarn.

Humidifiers should be found in every department of every cotton mill, with the exception of the packing department. The stock must be dried before working, especially in the case of highly compressed bales. There is a further benefit in giving the staple an opportunity to assert its natural effort to free itself from the matted condition into which it has been forced. There is at least 7 per cent moisture in every bale of cotton and such an amount of moisture makes it almost impossible to properly clean the cotton in the picker room, as dust, dirt, leaf and other foreign matter that separate readily enough when the staple is relatively dry, adhere most tenaciously to damp cotton. As stated, if the stock is opened and dried, we must lose approximately 7 per cent per bale. Therefore, in the card room, atmospheric conditions must be maintained so that the stock will begin to regain.

In the spinning department the final adjustment takes place in changing weight of stock into measure, a pound of material being drawn out into so many yards, according to the counts. If the 7 per cent formerly lost is regained in the carding and spinning, about a bale of cotton can be saved out of every hundred bales worked. There is a great deal to this subject, in fact, in many countries, the amount of regain is specified in each contract. If goods are made under conditions of, say, 4 per cent regain, the goods will gain in weight until they reach the average of 7½ per cent

STABILITY



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regain. This proves, without a doubt, that many mills give away a great amount of stock weekly by not attending strictly to atmospheric conditions in the various departments. Without humidifiers loss is sustained in both stock and production.

Next consider the operation of a cotton mill. Many mills can be found in which the spindles of the preceding process does not balance with those of the succeeding one. This results in a shortage of stock, causing one of the processes to wait. This is an easy problem for the man who understands the art of drafting. He simply draws less where there is a shortage of spindles and makes the machines having more spindles do the work. Another way to increase production in the card room is to make a heavy roving and remove the weight off the middle roll on the ring frame.

In the operation of a mill, nothing will increase production more than having hank clocks on every machine from the drawing frame to the spinning frame and mule. I know of a mill in which 48 deliveries of drawing could not keep up with the slubbers, but after hank clocks were placed on each frame, finished drawing was plentiful.

Contest Letter No. 13. Wash. (Conn.)

Increasing Spinning Production.

EDITOR COTTON:

An overseer, to get more production out of his room, must first have quality because quantity must not be secured without quality; he may have the best of work and still be unable to get quantity, but as a rule production can be increased when a mill has good running work.

There are various ways whereby an overseer of spinning may get more production, if he isn't already almost to the limit. I am a great advocate of the practice of having a clean floor at all times and I always give this my personal attention as I know the help will put more effort into their work when they see that the room in which they are working is clean. It is also very essential that spinners keep the rollers and roving clean also, to see that no waste clogs up in the bottom of the spindles and that all parts of the machines are oiled thoroughly.

I have learned from experience to keep up the back ends, such things as bands being off, bad rolls, bad rings and spindles, guide wires being out, hinder production and I impress upon the third hands and section men the fact that the production of the room depends upon the way in which they keep their work up and when their work is caught up, to circulate around the room; when the other help see they are on the job, they will follow their example and also keep up. Some mill men advocate increasing the front roll speed but I think that this is the wrong thing to do unless the stock is capable of taking care of it.

I have always told the men under me to talk to the help in a polite way and that they would do more for them if this was done, but at the same time to talk to them in such a way as to indicate that the orders given must be carried out. If this is done the help will, in most every case, do what is asked of them.

We have hank clocks on our frames and have taught the spinners and doffers that it is up to them to keep the frames running as we can readily see just which frames are not up to the mark and they do this to the best of their ability. We do not pay them by the hank clock yet. If, after taking the hanks on Saturday, I find a frame that has fallen under what it should do, I give the second hand the number of the frame and tell him to see about the belt; nine times out of ten the cause will be a slack belt or one that is in need of belt dressing.

A great deal of yarn can be saved on the spoolers after it is spun. I do not allow any spooler tenders to fix or cut any bad yarn. We have a girl who goes around and fixes all tangled bobbins and she saves every bobbin that she possibly can. It is her duty to see that the least possible waste is made and she alone can save 100 pounds of yarn a week.

But, as stated, the first and most essential thing in getting production is to have quality and where this is secured, it is easier to have a good organization, the help will be contented and satisfied, will never cause any trouble, and will do everything that is expected of them.

Contest Letter No. 52. Spinning Overseer (Conn.)

Spinning Room Suggestions.

EDITOR COTTON:

I have heard a great deal of discussion on warp and filling wind spinning, also tape and band drive. The only bad feature that I have been able to find with filling wind is in getting the proper tension on spooling, and when this is corrected I believe the filling wind will have advantage over the warp wind.

All my experience up to the past year has been on warp wind and I find that where I run a front roll speed of 170 r. p. m. on warp wind, I can run 175 to 180 r. p. m. on filling wind, and the work runs just about as well and of course gives greater production. A room containing 100 frames with a roll speed of 170 r. p. m. on 7s yarns will produce 8.17 pounds per spindle per week of sixty hours and figuring 216 spindles to the frame gives 21,600 spindles and 176,472 pounds. An increase in speed of 5 r. p. m. on the front roll will give 8.41 pounds per spindle, or 181,656 pounds, an increase of 5,184 pounds production, secured at practically the same cost as the former figure, thereby lowering the spinning cost per pound. (The foregoing production figures are secured by figuring the spindles at 90 per cent efficiency.) I also find that after the spinners become accustomed to the filling wind they prefer it to the warp wind, as the ends that come down are at the top of the bobbin which makes their work some easier.

As I said at the beginning, the only bad feature I find with filling wind is with the spooling and I believe that the proper tension device will eventually be found to correct this.

In regard to the tape drive, I believe the filling wind has more advantages over the warp wind than the tape drive has over the band drive. If the idlers are kept in good working order, a lot of soft yarn that would pass if the band drive was used may be avoided with the tape drive. In practically every mill there are men employed as oilers and banders and when they are busy oiling they cannot always stop to put on every band or tape that comes off and of course, there are times when it may be two hours before they can possibly get to all of the tapes or bands, as the case may be. Where the band drive is

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used, there is one end standing with each band off, and with the tape drive there are four ends standing with each tape off. Consequently there is a small loss in production here; however, there may be good points enough in favor of the tape drive to offset this one bad point. I would not attempt to "knock" the tape drive, as I am running both tape and band drives. Neither of them will give satisfaction without the proper attention.

Oiling and cleaning are two very important points in spinning and should be carefully attended to. There should be regular set times for oiling the different parts of the machinery such as gearings, pulleys and rollers. Great care should be exercised in oiling rollers, as only a small amount of oil at regular periods is necessary, but this small amount is absolutely necessary and should be applied by an experienced man. A great many rollers are ruined by the oiler carelessly allowing a few drops of oil to get on them. It is the duty of the section man to watch after the oiling and see that it is properly done. All really good section men do this as they realize more than anyone else the trouble caused by burned out pulleys and cylinder bearings.

It is my belief that it is the duty of every overseer, second hand and section man to look after the safety of the employees in their respective departments.

I noticed a few days ago a photograph of a spinner holding a roving bobbin in one hand and a knife in the other, illustrating the "proper method of cutting the roving from the bobbin." I do not think there is a proper way of cutting roving from bobbins and the mills that use this method certainly have to buy more bobbins than the mills that do not allow it. Spinners using knives for this purpose are sure to cut up the bobbins, and when the bobbins become splintered the operatives who handle them after they are empty will certainly break them up. There is considerably more waste made to be reworked where roving is cut from the bobbins, for if the spinners are required to pull the roving off, they will invariably allow the bobbins to run longer.

There is a machine for cleaning bobbins which seems to be very good. While I do not use one of these machines, neither do I allow spinners to use the knife. Smooth roving bobbins are purchased in order that the spinners will have no trouble in getting the waste roving off without the aid of a knife. By smooth bobbins I mean those without heads on the ends. I do not think the knife is very safe for a spinner to use, and I am sure that it is not best for the mill.

There should be a regular time set for the spinners to pick the rollers each day, and the men in charge should see that this is done. Of course, I do not mean that certain hours should be observed for this work, as it is necessary for the spinners to keep the roving set in and the ends up, picking the rollers in spare moments. It should be arranged to have all rollers picked as early after starting time, morning or afternoon, as convenient, however, if it is a rule to pick the rollers in the forenoon, it should not be put off until the afternoon. Spinners should keep the roving creels and thread boards clean and should be given a spinner's whisk broom to keep the rails brushed off.

L. O. K. (Georgia.)

More About Future Executives.

EDITOR COTTON:

On page 341 of the March issue of COTTON is an article bearing the signature of "A Mill Man, (Ga.)". The logic is worthy of consideration. However, our friend, "A Mill Man," is no doubt looking at the situation as though a ball was placed in front of him; he can see only that portion of it that comes within the focus of his eye. Another man, from another angle, sees only his portion of it. So it is in the manufacture of cotton, we must stop, think and remember that we are now in the reconstruction days and that means abnormal conditions.

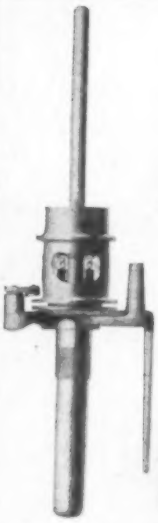
From a financial point of view. before we entered the European conflict there were, at a conservative figure, throughout the United States ten men to every available position and today there are fifteen positions or jobs open to every able-bodied man in this country. Upon that one point hangs the condition of all problems where assistance in the line of human help is demanded—and the American dollar is worth only 27½ per cent of its former valuation. Managers of any manufacturing institution, in order to maintain their help and increase their production, are being compelled to be more diplomatic and considerate in the management of their plants so as to fit the conditions governing the specific cases of each and every institution. No two factories of even the same capacity can be operated and managed in exactly the same manner. Each has its own peculiarities which have to be dealt with separately, and where these problems are being cared for as they should be these enterprises are moving onward and upward in the line of prosperity.

The principal secret in the success of an institution is first to be equipped with proper machinery, buildings, location, and comfortable dwellings, and to have good, practical, technically trained officers at the head of it and and in the various departments, where ability, practical and technical, is demanded to make the institution a success. Without these qualifications, it is needless to say that a man holding a position of this character cannot be the master of the situation when the occasion demands.

What we need most in the United States at the present time to secure better results, generally speaking, is to give more attention to the general education of the younger generation. We should not only have compulsory educational laws in every state, compelling all children between the ages of 8 and 18 years to attend school, but, we that are in position to do so, should see that these laws are enforced. I am sure that every one is cognizant of the fact that education gives us not only a more refined and talented race, but also a more ambitious and determined people by far, who are at all times trying to get forward another step. I also think it well to suggest that the old family Bible be read at home by the father, his wife and their children, gathered around him occasionally during the week nights after supper. This would, I think, help to eliminate our troubles, many of which, if we analyze them closely, will be found to be imaginary. Remember always that "laugh and the world laughs with you, weep and you weep alone."

H. W. R. (Texas.)

The main office of the Roessler & Hasslacher Chemical Company has been removed to more commodious quarters at 709-717 Sixth Ave., corner 41st St., New York City.



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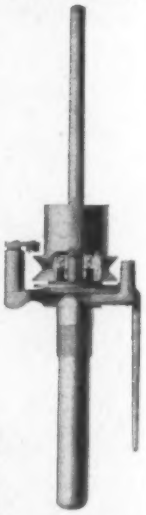

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Designs for Fancy Cotton Fabrics

BY T. WOODHOUSE AND J. IRELAND

PART FORTY-EIGHT.

A firmly-made and pretty cloth is that reproduced in Fig. 223, and woven with bleached warp and filling. There are two pleasing features in this cloth, first, the bold nature of the figures with the zig-zag effect which yields such a prominent effect; and second, the pretty and unique pin-hole or matt effect of the ground weave.

The complete design on 36 threads and 48 picks is shown at N, Fig. 224. The different markings have the

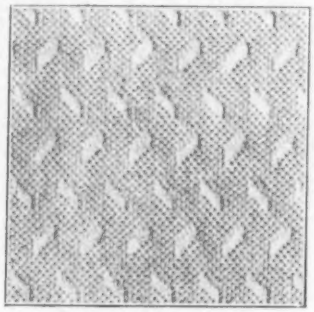

FIG. 223.

following significance: the crosses indicate where the double warp threads are lifted for the ground weave; the the solid marks show where 20 out of the 24 ground threads are raised to form the two oppositely-directed diagonal spots or figures; the dots indicate the movements of the 12 single warp binding threads. The threads of both types of warp are 2 ply twist yarns, and are arranged, two threads (or one double thread) for the ground and figure, and one single thread for the binder, the latter thread being of a much finer count than the others.

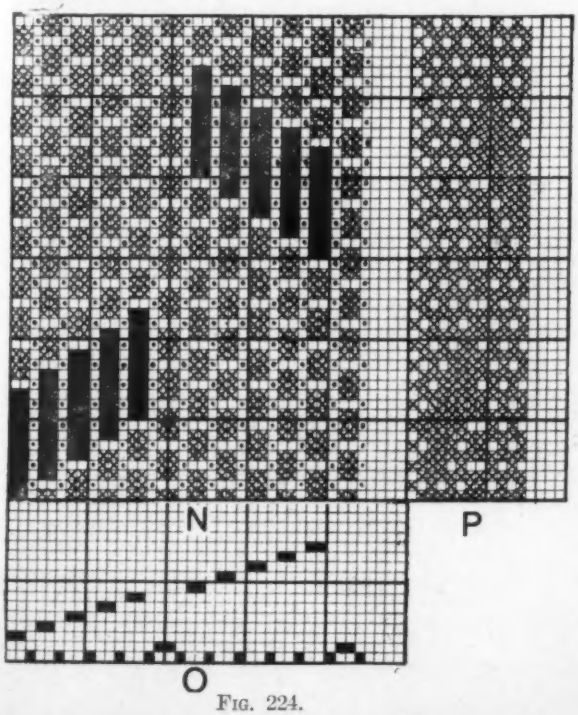

FIG. 224.

It will be observed from the design N that the binder threads all weave in the same plain order, and they are so arranged that they are lifted on those picks where alternate pairs of ground threads are down. All the double threads weave 3 up 1 down when forming the ground of the structure, alternate pairs of threads weaving the same as the first and third threads respectively of the 3 up 1 down twill. The figured portions are obtained by floating the double threads at the required positions over 11 successive picks, as shown by the solid marks.

The cloth could be woven in a dobby loom since it requires 12 harnesses as indicated by the draft at O; with this draft the weaving plan would be that given at P. In the finished state the cloth contains 45 double ground and figure threads and 45 binder threads, or 135 individual two-ply threads per inch, and 94 picks per inch of filling. The filling is a single yarn and approximately equal in sectional area to that of the two-ply figuring warp thread.

A very fine texture, and one that is calculated to wear well, is that reproduced in Fig. 225. This is also a type

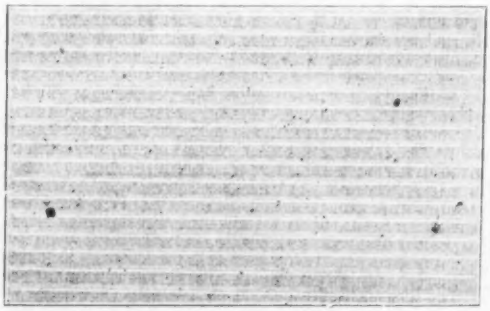

FIG. 225.

of pique cloth, but, although constructed on the same principle as the foregoing, it differs from them entirely in appearance. The cloth is all white, and there are three different counts of yarn used in its structure; the fine yarn is used for the face threads and face picks; the medium count yarn for the back threads; and the low count yarn for the padding picks. The yarn arrangement is 2 of face to 1 of back warp: 1 thread face, 1 thread back, 1 thread face. Filling:

Fine count yarn 6 5 4 6 6 3 = 30 face picks.
Low count yarn 1 1 1 1 1 = 5 padding picks.

35 in repeat.

The design for this cloth is submitted at Q, Fig. 226, and contains four repeats in the way of the warp and one unit in the way of filling. The unit weave is therefore on 3 threads and 35 picks, and the picks in the design are in the same order as the above arrangement of filling.

The face threads interweave with the face picks in 1 up and 1 down plain order as indicated by the crosses. The dots show that the back threads, 2, 5, 8 and 11, are lifted in pairs, and the diagonal marks indicate that all the face threads are lifted, with all back threads down

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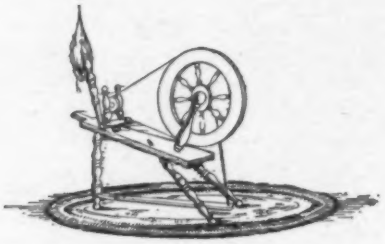

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when each padding pick is inserted. The latter picks therefore occupy a position between the face threads and picks and the back threads.

There are three threads in one unit, and three harnesses are required to weave the cloth as indicated by the draft at R, and the weaving plan on 35 picks at S. There are probably too many picks in a round even for a positive tappet loom; hence it is quite probable that the weaving would be done by a dobby. In addition, there would be at least two shuttle boxes required at each side of the loom and a pick-at-will motion.

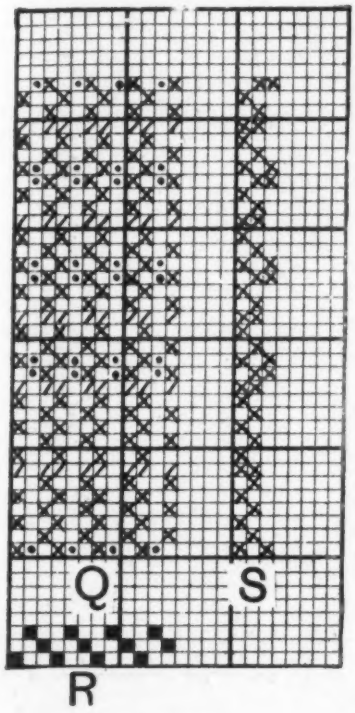

FIG. 226.

In the finished state the cloth contains: Warp: fine yarn, 108 threads per inch and medium yarn 54 threads per inch = 162 per inch.

Filling: fine yarn, 294 picks per inch and padding yarn, 49 picks per inch=343 picks per inch.

The attractive ladder-type cloth illustrated in Fig. 227 is a combination of pique and twill weaves. The stripe effect is due solely to the distribution of these weaves, for all the yarns are the same color—pure white. The widest part of the pattern consists of very prominent horizontal ribs, and the weave used to obtain this effect is a 12-pick pique weave. Between each pair of the above horizontal rib stripes is a series of narrower stripes, 5 in number. The first, third and fifth of these stripes are also very prominent features of the cloth; they are developed by means of a broken weave which results in a

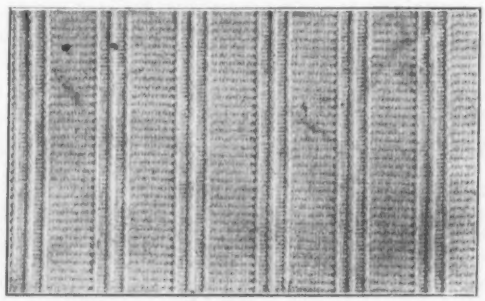

FIG. 227.

pronounced raised warp effect on the surface. These vertical stripes reflect light in a high degree, and by this means, as well as by the direction of the ornament, they lend contrast to the structure. The second and fourth stripes of the set of 5 are really formed by short horizontal ribs, the 6 pick pique weave being used for these parts. There are therefore two ribs in these parts for one in the broader ribs, and by this means the contrast is further emphasized. In each of the broad pique stripes there are 42 threads arranged as 2 of face to 1 of back, viz.: 1 thread face, 1 thread back, 1 thread face.

The same arrangement of threads obtains in the two narrow pique stripes, each of which occupies 9 threads.

In the central warp-flush stripe there are 8 threads, while 4 threads are employed in each of the side warp-

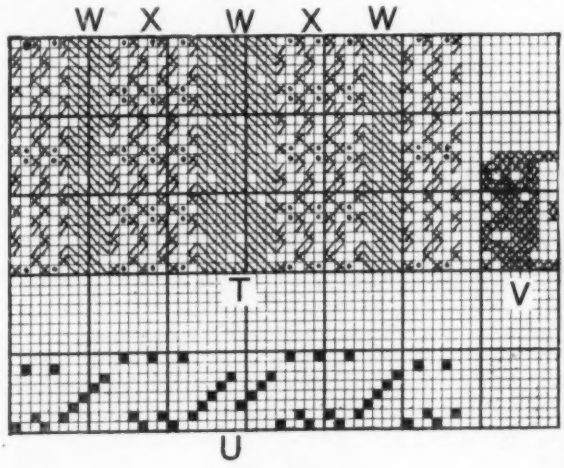

FIG. 228.

flush stripes. Altogether there are 72 threads in one unit of the design, but only 12 picks in a unit, 4 of which are padding picks for the pique portions of the cloth.

Part of one unit of the design is introduced at T, Fig. 228. A portion of the broad pique stripe has been omitted, but all the rest is introduced. The different marks represent the following:

Crosses equal face threads lifted on face picks in the pique stripe.

Dots equal back threads lifted on face picks in the pique portion of the design.

Diagonals right equal face threads lifted when the padding picks are inserted.

Diagonals left equal the threads of the twill warp-flush stripe lifted on both kinds of picks.

Since there are only 46 threads exhibited in the design at T, it follows that 30 threads of the broad pique stripe have been omitted, and as this stripe contains 42 threads, only 12 of them are shown. These 12 threads are represented by the first 6 threads and the last 6 threads of the incomplete design T. Between these two groups of 6, the full working particulars are given for the 5 narrow vertical stripes.

In order that the movement of the threads may be shown to advantage, we have introduced two units in the way of the filling. Referring to the design T, the three groups marked W at the top represent the positions and the interlacing of the twilled stripes, while the parts marked X are the two narrow pique stripes.

It will be noticed that between each pair of furrows in the broad pique stripe, there are four padding picks; these picks, as before, lie immediately underneath the broad horizontal ribs in the cloth. The position occupied by the padding picks is determined to a large extent by the

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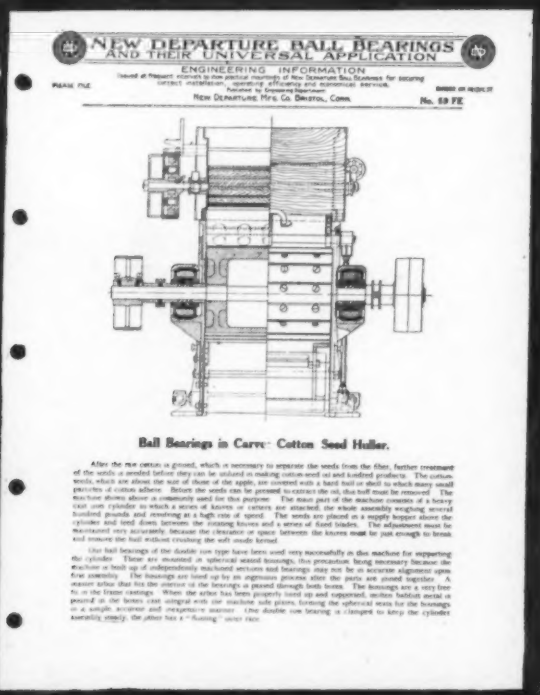

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back threads, or rather by the number of picks between successive stitching or rising points of the back threads.

The draft for the threads exhibited in the incomplete design T, Fig. 228, is shown at U and is on 8 harnesses. No addition to this number would be required for those threads which have been purposely omitted for the sake of space; these threads would be drawn through the harnesses in precisely the same order as those introduced on the first six and last six threads, i. e., harnesses 1, 7, 2; 1, 7, 2, etc.

We referred above to the prominence of the vertical stripes formed by the twill weave. This prominence can be accentuated, as is done in the case under notice, by using a lower count of yarn, i. e., thicker threads in these places than in the other portions of the cloth, and by crowding the splits or dents of the reed. In the cloth shown in Fig. 227, the number of threads per split in the twill section is the same as in the pique section, and hence an apparent increase of 50 per cent obtains in the twill section over that of the pique parts. The finished cloth has 170 threads per inch, and 258 filling picks per inch, including the padding picks.

Waterproofing Cotton Fabrics.

EDITOR COTTON:

If the weave has a close filling and warp spacing, small quantities of cotton fabric may be made thoroughly waterproof by the following method:

Procure gallon bottles and fill them about three-fourths full with gasoline. Into each bottle put about three pounds of finely cut paraffin and shake thoroughly, until most of the paraffin has been dissolved by the gasoline. Allow the bottles to stand for about 24 hours in a fairly warm place, away from any open flame. A thorough shaking every few hours will assist the gasoline and paraffin in mixing.

This liquid applied to the fabric with a brush and well rubbed into the pores of the fabric will effectually stop water from passing between the fibers. The action of the liquid being that the gasoline will evaporate and leave the paraffin in solid form suspended in the cloth. A gallon should waterproof about fifty square feet of fabric.

S. H. W. (Ga.)

Twisting Tire Fabric Yarns.

EDITOR COTTON:

I should like some information from your correspondents as to the proper twisters to use and the number that should be installed per thousand spindles for the production of cable cords for use in cord tire fabrics.

H. B. C. (Ohio)

EDITOR COTTON:

Replying to "H. B. C." will say that the usual construction of cord fabrics is 60 inch — 26 × 2½ — 13.95, using 23/5/3 warp and 20s filling. For this construction use for each 5,000 spindles:

Twelve ring twisters, 160 spindles each, 4½" gauge, 3½" flange, 7½" traverse for 7½" × 3⅛" spools, creels for 2 warper beams 28" × 54½", 9" barrels with 400 ends each, hank clocks, stop motions, single line top and bottom rolls, metallic thread boards and tape drive.

Six ring twisters, 108 spindles each, 7" gauge, 5½" vertical rings, 8" traverse for 8" × 5" spools, creels 4 slats high for 7½" × 3⅛" spools, hank clocks, stop motions, single line top and double line bottom rolls, metallic thread boards, and tape drive.

These will give an approximate production of 9,500 lbs. per week of 55 hours.

These twisters are built by the Saco-Lowell Shops, H. & B. American Machine Company, Whitin Machine Works, and the Draper Corporation. Artimus. (Georgia)

Dyestuffs and Textile Chemicals.*

BY JAMES A. BRANEGAN.†

Since one year ago there has been a decided change in the chemical situation in this country. At that time, six months after the Armistice, the enormous demand for chemicals for war purposes had ceased and the domestic consumption along non-war lines had hardly gotten started. Furthermore, the big export demand which came so unexpected had not struck its stride. The chemical markets were quiet and a plentitude of chemicals was predicted; in fact, a number of big concerns started to dismantle the additions erected for war supplies, and the writer knows of one concern which made one thousand tons of sulphuric acid per day, all of which they had been selling for war purposes, and who did not have an order on their books. Prices started to decline and no shortage was anticipated. Manufacturers at that time did not realize how short this country was in chemicals. Gradually the demand increased, and when this was coupled with the sudden export demand a condition of positive shortage along all lines was produced and this shortage exists today to such an extent that it is almost impossible to purchase a car of sulphuric acid, a car of ammonia, or a barrel of formaldehyde, while copperas cannot be had at all.

Considerable shortage also has been due to strikes at various plants, and strikes which have interfered with transportation. And to this has been added the delay in shipments at seaboard due to the great mass of shipping rushed to the coast for export. Contracts usually mean very little, as practically all carry contingency clauses, such as fire, strike, raw material, and transportation clauses, and the manufacturer unable to deliver always has something to fall back on. War conditions taught the chemical manufacturer how to protect himself and such phrases as "if unsold" and "subject to prior sale," which never were used by the chemical salesman in pre-war times, are common now.

During the year there has been very little of purely scientific interest added to chemical theory, with the exception of Dr. Irving Langmuir's theory of the positive electrons contained in the atom, which gives an explanation to the difference of valence in the molecules of the various elements and chemical compounds. This theory, while truly great and marking an epoch in chemistry, is

*Extract from an article in the Knit Goods Bulletin.

†President Kali Manufacturing Co., Philadelphia; Vice President Heyden Chemical Works, Garfield, N. J., and Consulting Chemist for the National Association of Hosiery and Underwear Manufacturers.

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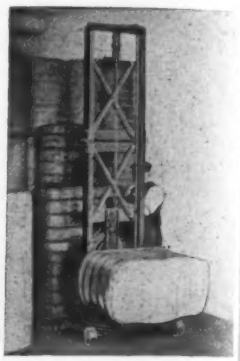

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of interest only to the trained mind. Dr. Langmuir is an American and received the "Wm. H. Nichol's Medal" for his discovery. The "secret" of a few dyestuffs has been re-discovered, but as these dyes were made in Europe before the war, they are not classed as adding anything to science.

Prices in most cases have gradually advanced 25 to 50 per cent. In some cases, like formaldehyde and the acetates, the advance has been due to violent changes in raw materials. Usually, however, the advance has been due to labor. This advance due to labor is evidenced in sulphuric acid and in its compounds. Sulphuric, which is the king of all chemicals and dyes, is made in large units, and as the process is automatic and continuous, it requires little labor in proportion; therefore, sulphuric acid sold in tank cars requires only a minimum of handling and the advance has been slight. On the other hand, sulphuric acid sold in carboys, which requires hand-filling, repacking, washing, careful carrying, etc., has advanced considerably in price. Likewise, chemicals made in small units, where a number of men are required on each unit, as with muriatic and nitric acids, etc., have had to be advanced on account of the high price of labor.

Acetate of lime, the raw material used in making acetic acid and the various acetates, advanced sharply, and advances in these lines will probably continue. Copperas, as mentioned, is practically unobtainable, but this is due to transportation troubles. Accident at the works of one of the largest chrome producers was the reason for the big advance in bichromates while the jump in formaldehyde was due to the big advance in wood alcohol. Wood alcohol is still scarce and therefore the shortage of formaldehyde will undoubtedly persist.

Ammonia is about 33⅓ per cent higher than a year ago and quotations are for futures only. Soda ash, caustic soda and bleach are all high and show no sign of weakening, and in addition, caustic soda is very scarce. Sulphide of soda has advanced 25 to 50 per cent and may go higher. A careful survey of the situation reveals no sign of a reduction in the price of chemicals used in the dyehouse or in bleaching and finishing.

Meeting of the Pennsylvania Division.

(*Continued from page* 717.)

the proper thing to do after shipping out all that had been sold would be to "shut down tight."

"If we had continued operating in the late winter and early spring of 1919 on the basis prevailing prior to the armistice," it was pointed out, "manufacturers would not have been able to command a living price for their product when jobbers later resumed buying." "We must not pile up stock if we expect to get a profit on cost," said a manufacturer of hosiery, who continued, "I believe you all will agree that the jobber is waiting for lower prices. We as manufacturers cannot make a lower price at this time, but if the jobber knows our warehouses are filled he will name the price, and we manufacturers that cannot borrow money to carry stock will have to give in. It won't do to weaken, for merchandise will cost no less than now and, I believe, will cost more. We will make a serious mistake if we build high price yarn into goods for the men with means to control."

In support of the idea that the market will not decline the recent statement of F. S. Cunningham, president of Butler Brothers, was introduced and the following quotation from what Mr. Cunningham said was read:

"Commodity prices will not be lower before the spring of 1921, even if then. Not a few goods will be higher this fall than they are now. In many cases fall goods which have been contracted for could be replaced to-day, if at all, only at higher prices than when contracts were made."

Several underwear manufacturers let it be known that they probably will make into garments all the cloth that has been knitted and, while they have not the remotest idea of committing themselves for cotton yarns, may put in process the yarn in stock. These manufacturers take the view that, already having an investment in materials, it will involve no great outlay to finish the goods and hold them for the better market to come. Manufacturers in this class, it was shown, were in a small minority, and feel they are financially able to carry whatever stock may accumulate.

An instance was reported of a merchant offering cancellations of an early 1920 order while demanding delivery of goods bought last year and now considerably past due. The manufacturer in this instance was agreeable to canceling both orders but is standing firm against shipping the low price goods unless the buyer also take and pay for what was bought at an advance.

The meeting was the largest in the history of the Pennsylvania Division and was presided over by S. D. Bausher, Glorie Underwear Mill, Reading, Pa., who at the annual meeting of the National Association in April was elected president.

Mr. Bausher, while not defending the attitude of jobbers, and scoring those who have sought to evade their obligations, said he detected a more friendly feeling toward manufacturers. Mill and merchant are coming closer, he thought, and he was confident business would be coming along in a normal way eventually. "We should not forget," he said, "that the jobber had to carry an unusual burden. They will ask for longer terms and will not buy a day earlier than they deem necessary."

What the meeting lacked in enthusiasm over present conditions was easily compensated for in unswerving confidence and a dogged determination to await the greater demand of the consumer and the convenience of the distributor.

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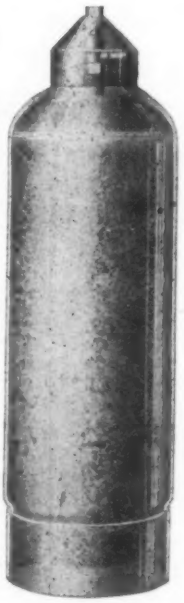

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Educating Industrial Workers

BY WILLIAM H. DOOLEY.

Education adapted to meet the daily needs of the industrial worker is coming to be as important as the education of the child.

We should bear in mind that the average length of a boy's school life until recently, was only about four years, and that was before he was twelve years of age. Then again we are not sure that he received this amount of education as no systematic method was adopted until recently to keep the boy at school. Consequently these boys who are now the industrial workers have received little, if any more education than that obtained during these four years.

With the development of the industries, which has been very rapid, have appeared new demands for more men, each with larger ideas, greater capacity and more training. At one time the shop and mill was a training school for workers but it is no longer so. The old apprenticeship system is dead and under the specialized condition of modern industries, a worker knows but one part of the numerous industrial operations. He works day by day at the same kind of work and under precisely the same conditions—the operation and the machine usually requiring little thought and ingenuity. The average worker knows nothing about the machine itself or the operations that proceed and follow his own, and very little about the raw materials that are used. Under such routine work and circumstances the industrial worker loses the habit of thinking, since no demand is made on him for thought. As a result of having had no systematic demand for his earlier education, by the time the worker enters manhood, or is ready to be promoted to a higher position, he is likely to forget what schooling he has had before the age of 12 or 14, and is apt to be intellectually less efficient than when he left school. Hence, it is not surprising that the average industrial worker in this country has neither the power to advance industrially nor to compete with the workers of Great Britain and the continent. European countries are far in advance of America along the line of industrial training. Every European industrial city of any size has a technical school which the operative may attend and receive technical instruction and shop practice in his trade. The result is that many of the successful workers, foremen, and overseers of our industries are foreign born men, educated in these schools; while numbers of American born workers are obliged to remain in the lower paid positions.

There is accordingly a large demand growing out of everyday needs for educational opportunities not afforded by the one existing public school system—a demand made by those deficient in early education who are desirous of making up this deficiency and by those who seek to supplement their acquired skill with technical training that will lead to advancement and increased power.

There is no question that the most ambitious workers in every industry will take advantage through evening or day study of every opportunity of securing a practical education. The success of the classes of the Y. M. C. A., the textile schools, and the correspondence schools bear witness to this statement. In the city of Lawrence, before the industrial school opened, over one hundred and forty workers traveled eighteen miles to attend an evening textile school, going directly from the mill and deferring their evening meal until they returned home near midnight. In the same city over 2,000 workers are enrolled in the correspondence school; paying from $40.00 to $100.00 for the course. How unsuccessful and difficult instruction by correspondence is, was pointed out recently in an article in the *American Machinist* which stated that but 2.6 per cent of the students have been awarded a certificate or diploma. The vast majority of men enrolling are soon discouraged, and frequently lose faith in their work.

The question may be asked, "Are not the existing evening schools meeting the demands of this kind of education?" In order to enter our present evening high or technical schools the applicant must be a graduate of a grammar school or pass an examination equivalent to the work of the ninth grade. As I have pointed out, very few of our industrial workers are graduates from the grammar schools and those who are not, cannot pass the entrance examination. Most of the students in the existing technical schools are superintendents, foremen, and overseers of shops and factories. So there is a call for an educational institution to meet the needs of the industrial workers. Some educators may say, as the principal of a textile school said to me, "Let these workers go to the evening elementary school until they are qualified to pass the entrance examination to the technical or evening high schools."

A former superintendent of public schools of Springfield, Mass., one of the foremost educators of the country, and one whose progressiveness is shown by the introduction of industrial training into public evening schools, sought to discover why mechanics, mill workers, etc., did not attend our present evening schools. One reason assigned was as follows:—Instruction in both the evening, elementary and high schools usually draws a large number of people who are relatively young,—that is, boys and girls from 14 and 15 up to 25 years. Older mechanics and mill workers, who may, perhaps, have some reputation in their trade, and who wish to perfect themselves in certain technical lines, do not wish to be grouped with persons of that age, feeling that such persons, having come recently from the public schools, are able to answer questions better, use English better, and appear to better advantage than their older associates. Mature men are often sensitive about the comparison which the younger members of the class are apt to make at their expense.

A second reason was that the public evening schools usually aim at teaching a subject quite systematically and modeled (possibly too much so) after the day schools. Industrial workers have intensely practical aims when they come to an evening school, and are unwilling to study systematically an entire subject; they demand that the instruction shall lead directly to the specific things which they want to know. If they are put into classes in which they are obliged to spend a month or more on preliminary work, the value of which they do not immediately discover, they will not attend.

So it is clear as the result of this investigation, that the present evening technical and evening elementary and high schools cannot meet the educational needs of the industrial workers.

As I said before the purpose of most of our evening technical schools is to give not only the highest possible instruction in science, but the application of this knowledge to the operations of the industry. The evening courses are the same as the corresponding day courses. What is needed is a school less pretentious in its programmes, lower in its requirements and giving instruction of a character more directly vocational or concerned with the daily needs of the industry.

The problems, drawings, and notes should be the problems, drawings and notes from the mill and shop so that the school may keep in touch with the industries. These problems could be obtained by a question box placed in the mills and school rooms. Special text books should be used. The instructors should be practical men working in the industries and conversant with the needs of the operatives.

Every student attends an evening course with a definite aim in view. So the evening instruction should appeal to the student immediately at the beginning of his work the very first evening. To illustrate what I mean; a young machinist had received a reprimand from his foreman because he could not read a working drawing with sufficient skill to do properly his daily work. He enrolled in the mechanical drawing course in an evening drawing school, thinking this course would meet his deficiency. He found that the first two lessons were concerned with lettering plates, the next three with drawing straight and curved lines and the handling of instruments, and that the remainder of the term was spent on the projection of points, lines, surfaces and solids. During all this time he was receiving in his daily work the same reprimands, and was therefore debating in his own mind the value of the drawing course. It is undoubtedly true that the drawing course this teacher had outlined is a proper one for teaching mechanical drawing for those who are to be draftsmen, but the average apprentice machinist like this young man does not see the direct application of this instruction to his daily work. He enrolled in the drawing school for a definite purpose. To be sure it was a narrow one, but nevertheless it had an economic value to him.

If the teacher had begun with some elementary instruction in the reading of simple drawings and to teach him in five lessons where to look for the dimensions denoting length, breadth and thickness; to show him the principles of simple sectional drawings and to have him comprehend the laying out of holes for drilling, the student instead of learning at the end of the fifth lesson, with no instruction which appealed to him, would be anxious to continue and receive more definite and thorough instruction in the theory of mechanical drawing, so as to be able to make sketches of machines and parts by means of a rule and a compass. Most of our mechanical drawing courses aim to teach the student to make pretty picture drawings. The average machinist's fingers are hardened so that he cannot manipulate the fine drawing instruments. It is impossible for him to draw tangents and hair like lines. Then again it is not necessary. The training a machinist needs in mechanical drawing is not the same as that of the student in the drafting room. The average machinist is deeply concerned in knowing how to make sketches of machine parts and to be able to interpret blue prints. A blue print drawing is really the language of the machine shop.

The instruction in the various branches of mathematics should be adapted to meet the needs of the mill operative, the machinist, and steam engineer. The problems should be expressed in the language of the mill, the shop or the boiler room. For example, how to find the heating capacity of a boiler does not appeal to the mill operative. On the other hand the problem of how to find the size of the pulley for a certain loom does not awaken the interest of the steam engineer as much as one involving the same operations, but dealing with the same problem in the boiler or engine room.

Students should be classified into vocational classes according to their trades. For example, in arithmetic, engineers should be in one class, and firemen in another; the textile designers in a class called cloth calculations and the loom fixers in a class called loom calculations. This idea carries out the plan of the old workingman's guild. The guild was formed for the purpose of social intercourse and mental stimulus. Each trade had its own guild. The daily trade experiences of each member became the property of all members. Discussion relating to the practices of their chosen trades occupied their attention. So today, working men have common trade interests. The teacher should act as a leader and draw out of the students their daily trade experiences. In this manner, by the expression of their various opinions, and with the suggestions of the teacher, the problems may be solved. It is difficult at times to get adult students to recite and express themselves at the blackboard. A free discussion of the point at issue makes the student lose his self-consciousness and before he is aware of it he is at the board illustrating his particular method of solution. Of course such discussions should take place under the wise guidance of the teacher.

Provision should be made for students who cannot attend school but once or twice a week. It is quite common for students to stay away because they cannot attend regularly. This applies to a great many textile workers. Usually they can get away one night, so provision should be made so they can come any night during the week, after the work is fairly started. Such a plan is feasible, as the writer has put it into practice. For instance, some firemen alternate in working day and night. A fireman who works this week days, will work night next week, and so on. The week he works nights, he attends the day (afternoon) classes and the next week he attends the evening classes.

Plans are rapidly progressing to make the Fourth Southern Textile Exposition, to be held at the Textile Hall in Greenville, S. C., during the week of October 18-23, the most successful in the history of the exposition company. This will be an "increased production and efficiency" show and it is expected that this year's exposition will be the largest and most comprehensive display of cotton mill machinery and supplies ever held in the South.

An explosion, the cause of which has not been definitely determined, followed by a fire, occurred at the Burrage Works of the Atlantic Dyestuff Company, Saturday afternoon, June 12, resulting in the death of two of the company's valued employees, and the destruction of a unit being devoted to the manufacture of a special product. The damage sustained at the company's dye producing units is being repaired temporarily; its stock of finished colors will doubtless enable it to take care of its current requirements until all dye-making units are again producing at capacity.

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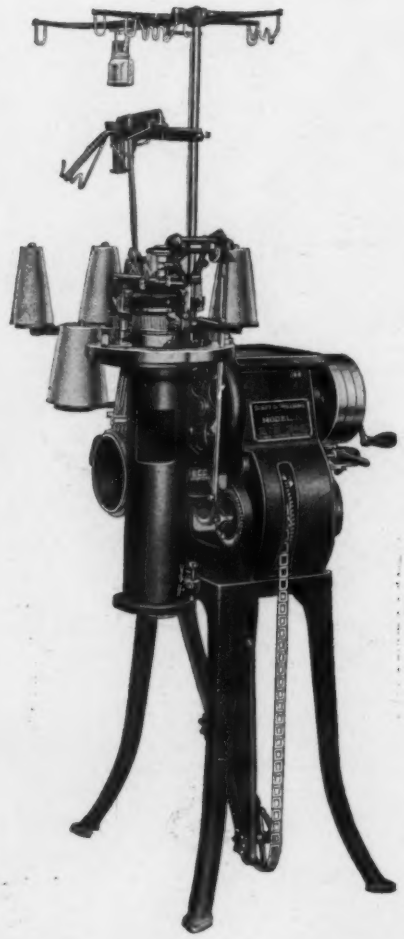

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The Cable Stitch

BY WILLIAM DAVIS, M. A.

Recently the markets have exhibited a revived demand for articles made in this very effective cable style of pattern worked in the pearl stitch on the knitting machine. Several seasons ago the prevailing note in the making of knitted coats was the plain stitch with ever increasing fineness of gauge or sett. Further on the plain goods were ornamented with very highly effective color contrasts and the more recent exhibitions of goods have revealed a return to the more fancy stitch with quieter colors for the garment itself.

It can be accepted as an axiom of the trade that no two elements of design should be employed in a garment in

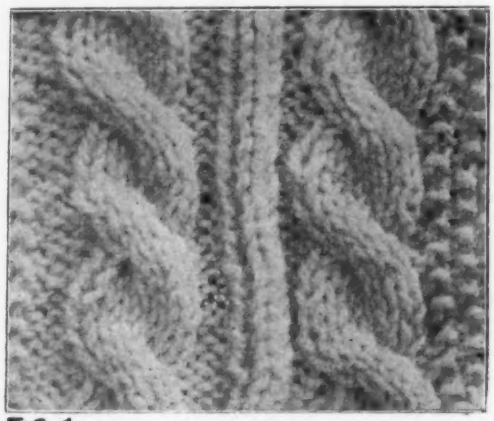

FIG 1.

a way which might cause them to compete with each other for the principal attention of the buyer or wearer, for if this takes place, then a large proportion of the effectiveness of the garment is lost. It is to the manufacturer's interest to see that what he introduces of novelty and change of stitch and color is utilized in the most economical fashion. If he introduces patterning or coloring agencies, let those be employed in such a way as to secure their maximum effectiveness.

In the kind of stitch under consideration, the predominant feature of the garment is undoubtedly the bold stitch and this being the case, the color element should be subdued in hue, the best results being procured in garments which are worked in solid colors throughout.

Figure 1 is a reproduction of a cable stitch design taken from a fabric worked in a coarse stitch on a flat knitting machine which has sprung suddenly into favor with the public for the knitted garment trade. It will be noted that the cable or rope effect stands out very prominently in the design, this being worked on a ground of pearl stitch so as to elevate it above the general level of the fabric. The curving or torsion of two strands of a cable or rope are graphically reproduced in the fabric, the strands curving round each other in plain stitch with the intersecting pearl or back stitches introduced. This design is produced on a five needle flat pearl knitting machine and a considerable amount of manipulation is required to give the correct result unless the jacquard is employed. The effect is rendered bolder by the two rows of plain fabric stitch which run vertically between the two cables, this row of plain loops alternating with a smaller broken effect arranged in pearl and plain stitches after the manner of the plain weave in the woven structure. The repeat of the pattern occupies about 3½ inches in width whilst the repeat in the length extends over 16 courses or little more than 1½ inches of fabric. The pattern reaches the acme of boldness when worked in a coarse gauge knitting machine using a strong, clear surfaced yarn. It should be stated, however, that the successful application of this particular pattern is restricted to the nature of the wearer's figure. It looks decidedly odd on a person of stout appearance, but on the other hand, an individual of tall slender build contrives to exhibit the garment made in the cable stitch in a very becoming manner and ladies are not wanting who are willing to don such decisive garments.

Extreme boldness of stitch can be modified in several ways so as to render the garments made in these stitches much more general in their adaptability to the wearer and the first device is to break the continuity of the cable

FIG 2. B A B

by throwing across it a horizontal row of stitches of pearl work, which has the effect of considerably subduing the resulting pattern. In Figure 2 the various design elements are marked A and B in a vertical direction and D and E in the horizontal direction. Section A consists of a vertical stripe made up of one and one or plain weave, having a right-side stitch and a wrong-side stitch alternating. Section B will be noted to correspond with the rope-like pattern in general appearance but the pronounced effect is suitably modified by the introduction of two cross rows of wrong-side fabric. In addition to toning down the boldness of the original rope pattern, this device has an important bearing on the texture. Whenever there are large basses of plain fabric alternating with basses of wrong-side fabric the former bulges on to the face and the wrong side fabric occupies a position in the hollow so to speak. This gives rise to a variability of surface which is not desirable and which often causes looseness of texture.

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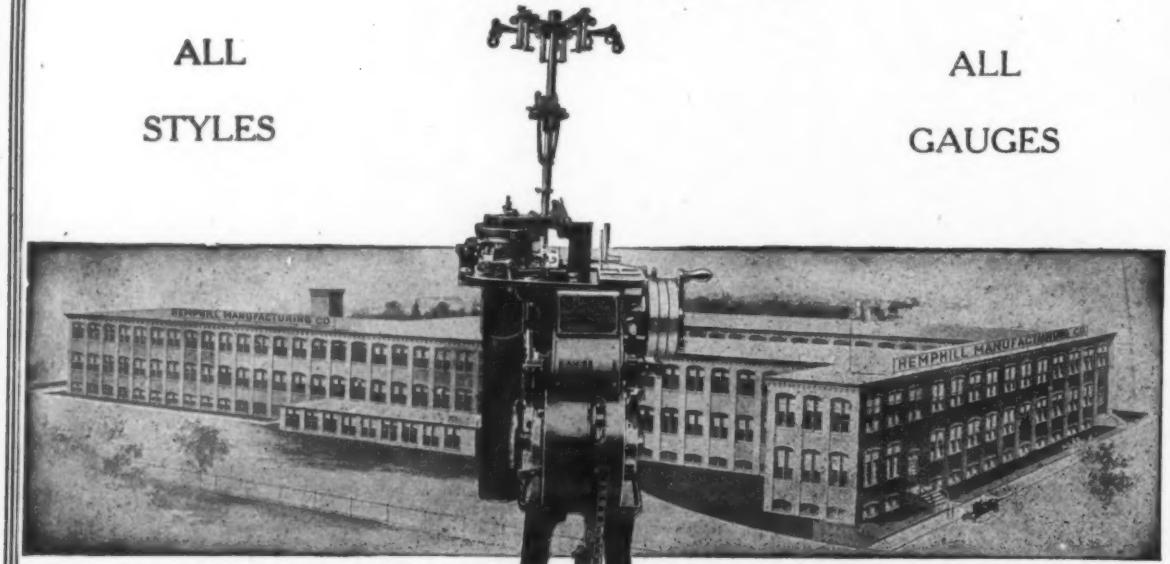

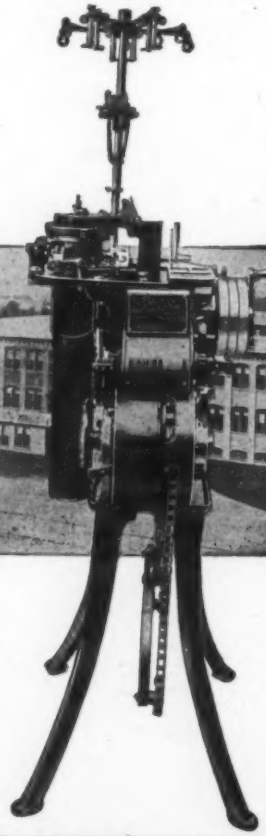

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When the wrong-side fabric stitches are thrown across a right side area, they have the effect of balancing the structure at that point and making the face of the cloth more regular, whilst the increased intersections give greater firmness to the fabric texture. In this pattern also there is a slight diminution in the size of the cable employed. The part D illustrates a very effective means of producing variation in the pattern at the extremities of the body parts and which affords quite an ornamental feature to the garment, also improving the finished appearance of it when compared with what would be the case if the ground pattern were continued right to the end. This border may be of any length, from 3 to 5 inches being

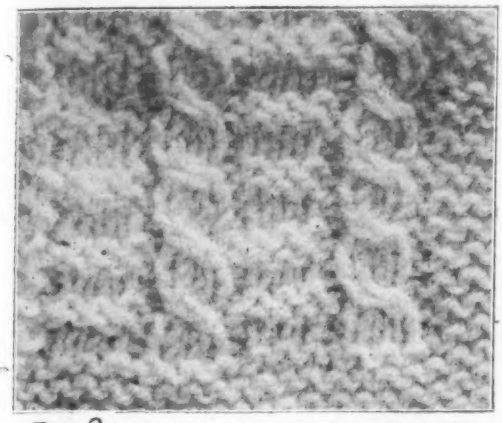


FIG 3. A B C D

usual, and is worked in the ordinary one and one garter pattern, one cross row of right-side stitches alternating with a one cross row of wrong-side fabric stitches.

These patterns are entirely suitable for a large variety of juvenile garments, particularly child's coats, where it is advisable to make the patterns smaller to correspond to the size of the garments. A pattern adapted for this trade is given in Figure 3 where the section marked A consists of a vertical stripe of 2 and 2 pearl stitch whilst the part B is a smaller variety of rope-like design only 4 stitches in extent. At C is shown a border of one and one garter pattern which runs right up the garment along the edge, whilst at D in the cross direction a similar pattern is made to run along the bottom of the article. The bold pattern stops within an inch or two of the edge and this gives a very effective finish to the article.

Design 4 shows a variation of stitch produced to give a basket effect which is always more or less in vogue for this kind of trade. The vertical portion A consists of 1 and 1 pearl stitches arranged like the plain weave in a woven structure whilst the part B consists of a basket effect made up of 3 cross courses of loops of wrong-side fabric alternating with 3 cross courses of loops of right-side fabric.

The cable stitch has lately made its appearance in the scarf trade and worked in thick yarns they appeal to many wearers and are novel and effective. Again the striking stitch formation is well toned down by a piece of one and one pearl stitch round the borders.

Problems of Production.

These patterns are free in their arrangement of stitches

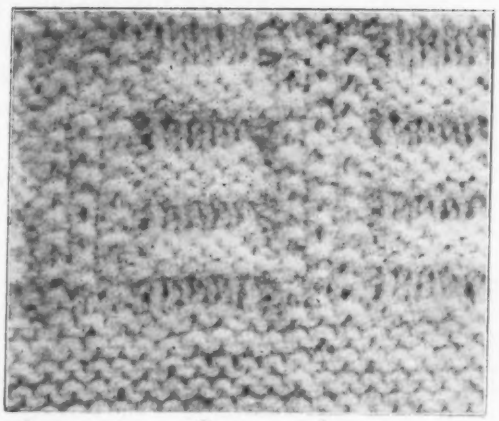


FIG 4 B A

and present certain difficulties to the manufacturer. This branch owes its origin to the activities of the hand knitter who in coarse stitch articles can give a degree of novelty to a garment which can only be obtained with difficulty in the ordinary pearl stitch machine. The usual type of pearl machine employed by the manufacturer has a limited capacity for making patterns and although quite a large assortment of patterns such as stripes, basket effects, etc., can be produced, yet it cannot make the freer style of patterns, such as the cable stitch, without a considerable amount of manipulation by hand. If the garments are worked in a coarse stitch with 3 to 5 loops per

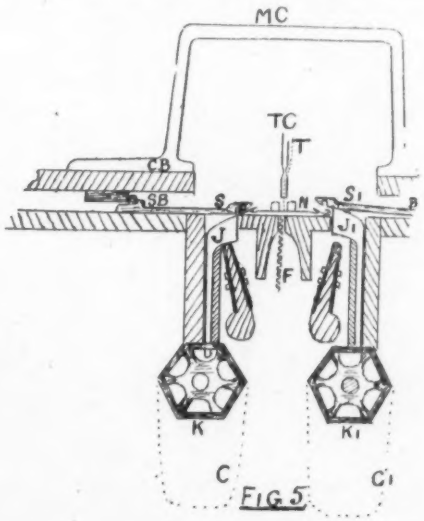
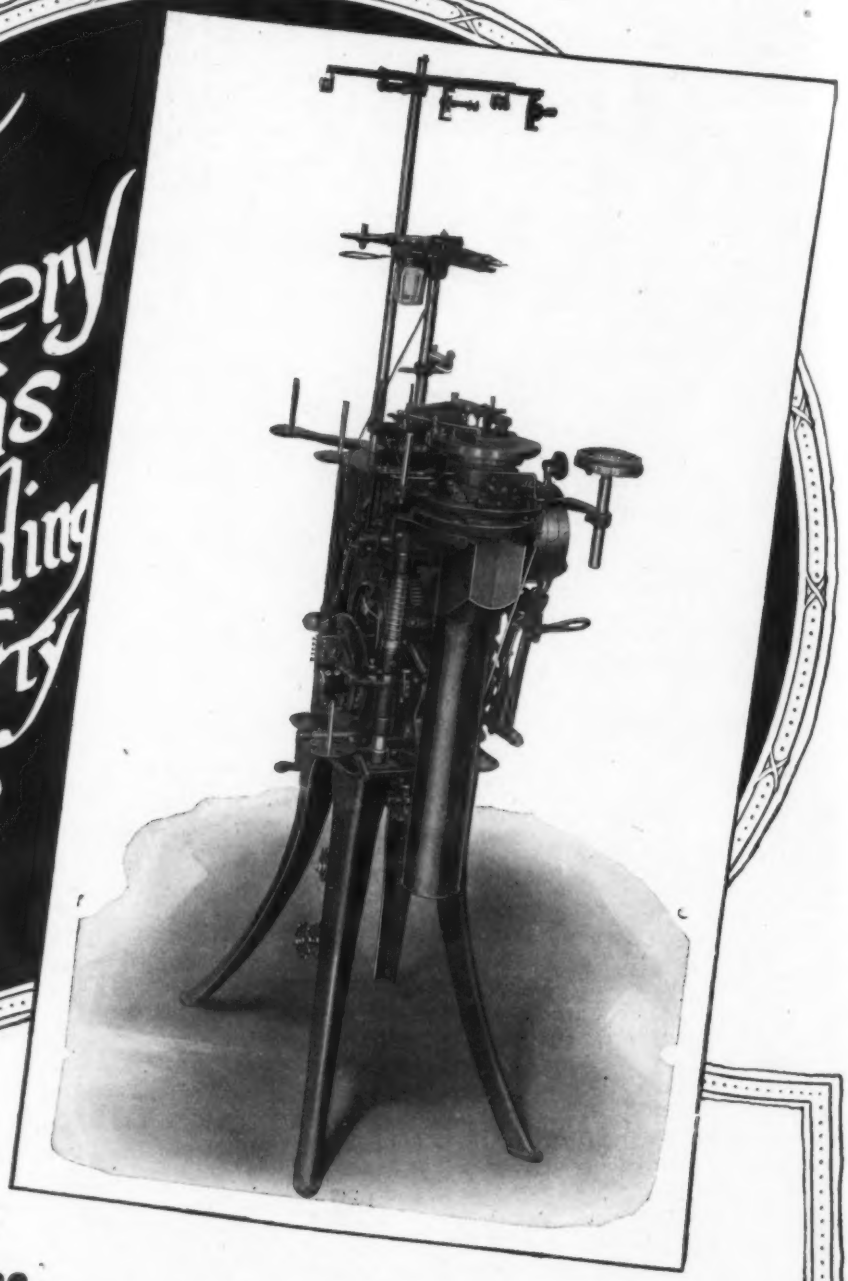


FIG 5

inch, hand workers can achieve quite a large production but if such trained and patient workers are not available, the only resource is the never-failing Jacquard selecting mechanism. This has been adapted to the pearl knitting machine, but as long as the simpler patterns are in demand the manufacturer finds sufficient variety without having recourse to the more complicated Jacquard, with the trouble of producing cards to a given design. Many have the standard plain machines in their equipment but have not the more complicated variety so that it becomes a matter of careful speculation as to whether it will be worth while to secure the Jacquard. Can he reckon in having sufficient margin of profit from one season's run to

The Hosiery Buyer is Demanding QUALITY



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warrant his installing a series of such machines? Whilst the patterns may be in favor next year he had better base his calculations on a single season's run.

If, however, the manufacturer wishes to enter this branch of the fancy knit goods trade with any prospect of success, he will require to install machines of the pearl knitting variety which are more extended in pattern capacity. Figure 5 gives a view of a machine fitted with a Jacquard attachment so that it can produce with facility all the kinds of patterns here mentioned with a limitless possibility of other varieties if cards are cut with which to work the machine. The carriage is shown by the arch MC which connects the two cam boxes CB and CB1 and affords a means of moving these simultaneously from side to side during the knitting operation.

Connected with this machine carriage is also the thread carrier TC through the eye of which the thread T passes on its way to be fed into the hooks of the needles. In the cam boxes CB and CB1 are the parts which operate the sliders S and S1 respectively during the knitting action, S1 representing the sliders of the right hand bed and S those of the left hand bed. The cams act on the sliders at the points SB and SB1, respectively, which represent the slider heels or butts. The needle N is horizontal and of the double ended variety, with a hook at each end and a corresponding latch in the usual form. Directly above the hooks of the needles the sliders are noted to have their extremities shaped to fit into the hook and it is in this way that the slider connects with the needle in order to impart action to the latter; it is obvious that the needle cannot be engaged by both sliders at one and the same time, when the one passes out of action the other moves into action and vice versa.

When the needle is worked from the left-hand needle bed the stitches are discharged to the right and when the needle works from the right-hand bed the stitches are discharged to the left. This difference in direction of the stitch discharge is responsible for the pearl stitch and the Jacquard attachment makes it possible to select any needle at will to work in either of the two needle beds. The attachment is shown in the under portion of the machine where the chief features are the card cylinders K and K1, cards C and C1, jacks J and J1 to operate the left- and right-hand beds alternately. The jack has two positions, one a raised position as on the right bed at J1 where it is seen to be raising the slider S1 out of contact with the hook of the knitting needle. The cause of this being done is to have no hole cut in the card at that point so that when the cylinder moves against the lower end of the jack, it is pushed up by the solid part of the card and the slider is thereby lifted. The alternate action is shown clearly at the left of Figure 5 where the jack J is shown in its lower position which is made possible by a hole having been cut in the card at this point so that the lower part thus falls into contact with the left hook of the double ended needle. This means that the needle will be drawn into the knitting position on the left bed and will continue knitting on this side so long as a hole is cut in the card for this particular needle. It will thus be seen that the whole process depends on having two sets of cards, one working the right-hand cylinder being cut with holes at the needles which have to knit on the frame from the right-hand bed, and where no holes will cause the jacks to lift the sliders out of contact with the needle ends. The cards on the left side must be directly opposite to those on the right so that when one jack rises, the other falls and vice versa.

Meeting of the Pennsylvania Division.

Following the declaration of the Southwestern Division of National Association of Hosiery and Underwear Manufacturers in the meeting in Chattanooga in May, the Pennsylvania Division of the Association went on record by an almost unanimous vote in favor of curtailing production in knitting mills so long as distributors remain out of the market.

This sentiment was ascertained on a call of the roll at the June meeting in Hamburg, Pa., attended by manufacturers of hosiery, sweaters and underwear.

Light weight underwear mills in the main were reported operating, most of them, on short time, in the completion of orders, none receiving any new business. Some of the hosiery mills were shown to be running from three to five days a week, the latter working seven-hour days.

Cancellations in considerable number were reported having been offered by jobbers, few of which are being accepted, except where mills are in arrears in deliveries. A list of merchants who had submitted cancellations was read, and a resolution was adopted to the effect that a copy of the list and additions thereto be sent to any member requesting it, with the understanding that such members report to the organization cancellations received by them. In this way, it is expected, there will be made available for future reference the names of many merchants who, while going into court in a rising market to enforce deliveries or recover for loss sustained, do not hesitate to return merchandise arbitrarily or repudiate their obligations in a declining market.

Another resolution which was adopted expressed it as the sense of the meeting that unjust or promiscuous cancellations be not accepted. "Suppose the canceler ignores this attitude of the manufacturer and refuses to accept deliveries or to make payment for shipments previously taken in, what would you do?" was asked by a member.

"Go after him through a court of justice and lose no time in doing it," was the substance of a dozen or more replies.

During an exchange of views of mill and merchandising conditions the executive of a large underwear mill stated the factory was closed down tight and would resume operations only when there was assurance of a movement of the product.

Another underwear manufacturer who recently was asked for a lower price on medium weight garments announced an advance of one dollar a dozen on one line and $1.50 on another. The mill is completing orders so that there can be no excuse for non-acceptance of merchandise on the ground of delayed delivery from the mill warehouses to the railroad, whether the carrier receive the goods or not.

Discussion of the curtailment proposal brought out an emphatic expression from a number of members that

(*Continued on page 707.*)

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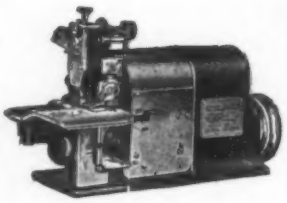

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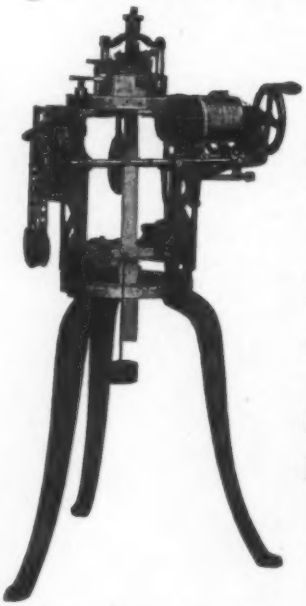

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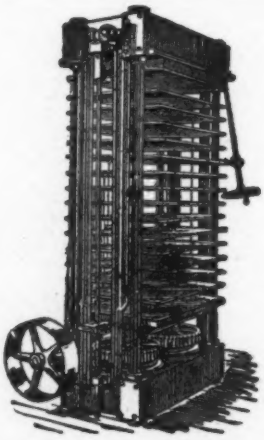

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The Knit Goods Market

The first of the summer months brought no improvement in the knit goods market. There was compensation in the fact, however, that by the end of June the wave of cancellations had subsided and there had developed a solidarity among manufacturers on the question of restricting production to conform to demand from distributors.

Cotton hosiery held firmly throughout the period during which imperative price reductions were being made in department stores and jobbers and retailers were repudiating orders arbitrarily for loading first hands with accumulations to be used later for beating prices. Efforts of the big retail stores, compelled to liquidate their stocks and pay their bills, to force lower prices at the source were unavailing. Some of the jobbers who had cancelled were glad to reinstate their orders, and in a few instances that have come to light, at prices higher than those at which the goods originally had been contracted for.

Silk knitted goods went the way of the raw silk market —downward, but it is significant that prices of manufacturers have not had such radical declines as had raw and thrown silk. In silk manufactures prices have been supported to some extent by stimulated extravagant buying by the public yielding to the alluring display lines in department store advertisements and the belief that stocks are being absorbed at a rate that promises to rid the market of any dangerous surplus.

Considering what the market has undergone, from attacks by the ever-present bolshevist element in labor to predictions of dire disaster from the lips of financiers and commercial heads of repute, it is gratifying that cotton goods in particular maintained about their level of values. About the time that jobbers were manifesting a disposition to do business with manufacturers, Wharton Barker, the eminent Philadelphia banker and financier, came out in a statement which was given considerable publicity "that prices will continue to fall."

A drop is as logical as it was that prices should have advanced when production was at top notch and this country was clothing the world and supplying wear for soldiers, to be shot to pieces, but it seems a safe prediction that any forecast of future prices will be far from accurate if there has been left out of consideration the effect of strikes and voluntary shutting down of industrial plants. Were the production level of the war period, when demand outran supply, to be continued, prices would fall because of an excess of commodities, just as surely as they rose when during the war there was an excess of demand. This is well illustrated in the affairs of the Elgin Watch Company as referred to by C. H. Hurlburd, president of the company. If correctly quoted in a Philadelphia newspaper which printed an apparently authorized statement from Mr. Hurlburd, he said: "Our sales exceed those of a year ago by 20 per cent. Our production increased 60 per cent."

It is obvious that at this rate of production and consumption the watch company will have a surplus of stock, either to be disposed of at prices which the public will be willing to pay, or held for prices which the company will be willing to accept.

In most branches of the knitting industry demand and production have been more nearly abreast, and, measured by the recent buying of the public under the spell of special sales, 20 off or otherwise, it is a question whether even now there is as much as one-half of the quantities of knitted articles between raw material and finished product in retail stores as under pre-war normal conditions. And it would appear that between voluntary closing of plants and shutdowns due to strikes, production, more especially of underwear, will drop to a dangerously low level—so low that instead of the prices which Mr. Barker and Mr. Hurlburd foresee there might be a rise, as to some lines.

It is estimated that labor disagreements in Cohoes, N. Y., are entailing a loss of production of underwear amounting to 75,000 dozens a month, the estimates taking into consideration the fact that two of the Cohoes mills are no longer engaged in the manufacture of underwear. That of J. W. Himes has gone out of business and the Kavanaugh Knitting Co. have leased their plant to the Beaver Falls Manufacturing Co. and to be devoted, it is understood, to the manufacture of automobile tire cloth. The strike, which is general, has been in effect about five weeks, so that already it may be reasoned, more than 80,000 dozens of underwear, which it was contemplated would be in stock by fall, has been taken out of the season's production. What a few weeks ago might have been looked on as a possible oversupply now appears to be an under-supply. To make matters worse for the ultimate buyer, the underwear which ought to have been made on the present wage schedule probably will be manufactured at an increased wage cost, for the Cohoes mills are threatened with a demand for a 15 percent advance on July 1.

The present disturbance involves no question of wages, hours or conditions, idleness in the mills being due simply to a bitter rivalry between labor organizations—the United Textile Workers of America and Amalgamated Association of Knit Goods Workers. Manufacturers and the public welfare have not been considered and the latter have had no voice in the matter.

A sharp demand for fall underwear probably will develop with the offering by jobbers of duplicate business. There is promise of very keen interest with the continued shutting down of mills.

It is a known fact that in February many jobbers had in warehouses less heavy underwear than of light weights. While considerable has been taken in, production still is behind commitments, and shows no sign of an early catching up.

Cancellations of fall underwear orders were offered until it began to dawn on the cancellers that orders could not be reinstated at prices at which purchases were made at the opening. Advances have stuck, and since the cotton crop condition report was made public it has been felt in some quarters that further increases will be announced as the end of the delivery season approaches.

Yarns might drop materially without affecting heavy underwear prices, it is pointed out, as labor costs have increased since last winter and production has fallen off, so that it appears at this glance that supply and demand alone will fix prices on late duplicate business.

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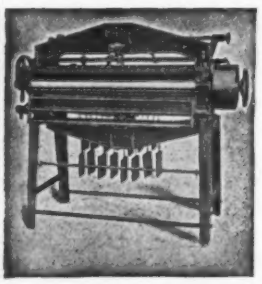

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Some of the leading mills have sold every case that it will be possible to turn out between now and December. One very large mill in particular started the season with an absolutely bare floor and is not yet abreast of orders, while reorders are being offered. This mill has not received a single cancellation.

Radical curtailment already is in effect in the light weight underwear industry in Pennsylvania, although the cut is not yet general. Two mills are completely closed down and it is very uncertain when they will resume operations. One is getting off only 50 per cent of the production of January last. Four are producing as much as in January, when, however, output was under capacity, one mill at that time producing only 50 per cent of equipment capacity. An eastern Pennsylvania mill has had a loss of 30 per cent since January.

Of 27 Pennsylvania hosiery mills canvassed, three are closed down tight. Five report production about the same as in January, and in one the employees are showing a disposition to turn off more work than formerly, this being attributed to the announced intention to dispense with the less efficient operatives for the present.

Among the mills in which production has fallen off the curtailment, compared with January, ranges from 10 to 55 per cent depending on the character of output. Low end cotton hosiery has suffered less than mercerized and silks. A full fashioned mill making silks has lost about 27 per cent. One full fashioned mill is operating on about the same plane as six months ago, but there is a well defined movement among this class of mills to operate only part time so soon as orders have been completed.

Two of the seamless cotton hosiery mills are down to one-half of the January production; four estimate the loss at 45 per cent and three from 27 to 35 per cent. A mill making misses' fine gauge ribs is maintaining output on the January basis and is receiving a few orders at the market, and no cancellations. The output is from carded yarn.

It is conservatively estimated that the loss of production of cotton hosiery alone in Philadelphia amounts to 25,000 dozen pairs per week. A mill getting 45 per cent of the January output operated at that time 500 knitting machines. The equipment in most of the others runs into an average of 150 machines. Notwithstanding the somewhat gloomy outlook from the standpoint of the mill help, operatives in one branch of work have formulated a demand for a 25 per cent increase in pay effective August 1st.

A Philadelphia mill making cotton hosiery which has closed down in the absence of orders is being besieged with requests for quotations on seconds. One of the Wanamaker stores was looking for seconds, wiring a mill to reserve several cases.

Some of the southern hosiery mills are operating part time, as this was shown at the recent meeting in Chattanooga, Tenn., to be necessary for safeguarding manufacturers. One group of six mills which had been operating five and one-half days per week have reduced the working time to three days, thus curtailing output by five-elevenths.

The attitude of labor, even in the face of mills closing down for want of business, is shown in a strike in a Philadelphia hosiery factory for pay for service that could not be rendered. The mill shut down on Tuesday, June 1, for curtailing output. When the factory was about to resume on the 2d, the machine fixers gave notice they would have to be paid for Tuesday. The management stated emphatically that while it had been customary to grant pay for holidays when operations were suspended, pay would not be allowed for time that was lost by reason of the mill getting no business. The fixers struck and the mill shut down.

It is regarded a safe assumption that had curtailment gone into effect when jobbers retired from the market two months and more ago there would have been fewer cancellations or orders. Knowledge that manufacturers still were producing seems to have left the impression among distributors that merchandise was accumulating and later might be obtained on buyers' terms.

It now develops that some of the better known jobbers are not adverse to the shutting down on production. There has existed fear among distributors that mills might be forced to dump accumulations on the market before goods in jobbers' hands and on order had been invoiced out. For mills to sell at radically lower prices than have been prevailing, it is pointed out, would operate to the serious disadvantage of jobbers. It is felt that the interests of both manufacturer and distributor are at stake, and in the hands of the former.

Some very adroit shopping for squeezing profits out of prices is being engaged in by jobbers in apparent need of goods.

A New York jobber writing a manufacturer of hosiery for his latest price list and information as to deliveries, said: "We understand there is a strong tendency toward a drop in prices and we are informed by various mills that there has been a decrease since you last named prices."

The mill replied in effect: "While it is true yarns are cheaper, they are not yet down to the price where we own yarn. There is hardly a number in our line that we could duplicate at today's selling price. To us it appears that cotton and cotton fabrics will be higher."

The mill, although in want of business for keeping help employed, declined to quote, advancing as a reason that the jobber probably would use the figures for obtaining still lower quotations from other mills.

Letters such as that referred to are not rare, and occasionally a buyer drops in with the consequential air of a person intending to negotiate for quantities. "Give me your best price," said a visiting jobber, referring to a popular number of hosiery.

"Are you sincere?" asked the mill executive.

"Never more in earnest in my life," was the reply. "We want hosiery."

The mill's sales manager quoted on 25 cases for immediate delivery. "I'll think it over and see you tomorrow," said the buyer.

The sales manager came back with, "The figures I gave you are for immediate acceptance and do not establish a price. My offer holds good only until you quit this office. After that they will have been withdrawn and I would not sell you this afternoon at the price I stated for this moment only."

The buyer placed no order, but, it is understood, he started out to find a mill to buck against the one with which he had the interview.

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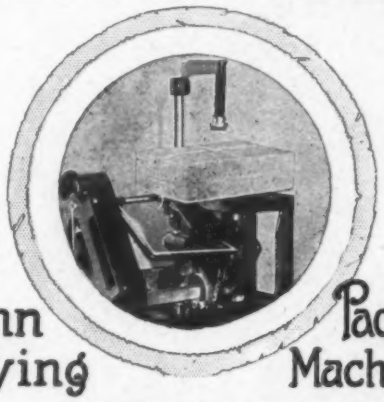

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Made in two models, one winding the string in one direction only and the other in both directions. Write and tell us just what you have to tie, and we will advise what model will best fit your needs.

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Manufacturers of North Carolina BOX SHOOKS, BOX LUMBER and CRATING MATERIAL.

We Make a Specialty of the Textile Business.

A southern mill is reported offering misses' coarse gauge ribs (24 ounce) at $2.25.

A mill's price of 144 needle half hose, sewed toe, has been marked $1.50.

A recent order for brown and white mix full seamless 144 needle cotton half hose from a Pennsylvania mill was placed at $1.75 a dozen.

A Philadelphia jobber who three weeks ago said he would not buy a dollar's worth of hosiery, two days ago inquired if it might be possible to locate odd lots of cheap cotton hosiery of which, he stated, he was in need.

Misses' coarse gauge ribs, 28 ounce, are quoted at $2.40 to $2.50 and are holding. Misses' 300 needle carded ribs have been sold within a week to jobbers at $3.50.

The New York office of an important southern mill rejected an order from a jobber for misses' 28 ounce ribs at $2.35. The mill's price is $2.50 and a lower price will not be accepted.

A jobber's order for a considerable quantity of hosiery was rejected by a New York selling agency because the buyer insisted on a guarantee against decline of prices to the end of deliveries running through June, July and August. Subsequently the order came through for June and July, no price guarantee.

The next move of distributors will be a drive for a guarantee of prices against sellers' declines, the rock on which mill and jobber split in early 1919. This is made apparent in intimations which mills have received in relation to underwear for spring 1921, and an announcement by several manufacturers of bathing suits that when they start out soon for next season they will guarantee buyers against declines in sellers' prices.

One distributor states to an establishment with which he has been dealing for years, "Protection to date of shipment will not be sufficient. We feel we would not be safe in buying unless prices were guaranteed for practically the entire season, to apply to your goods which we might have in stock."

The mill to which this letter was addressed will not guarantee prices and will not accept a cancellation. The sales manager of another mill said his establishment might consider expending a guarantee for getting business started. "Will you accept from the jobber a guarantee that he will take the merchandise under the guaranteed price should prices elsewhere decline?" the sales-manager was asked. "We will guarantee prices only under an iron-clad contract," he replied.

Even at that, it was admitted, sellers not infrequently would be drawn into controversies initiated by buyers for obtaining concessions. After a mill had sold well up at prices guaranteed against its own declines, other mills, it is logical to assume, would quote under, for inducing buyers to shift their orders. In that event, it is pointed out, buyers would insist that mills which had given them the guarantee meet the prices at which competitors were buying from other mills, and unless the guaranteeing mill acquiesced, the jobber, experienced in canceling, would not hesitate to undertake what he is attempting to do in the present situation.

It is believed among jobbers that manufacturers who permitted arbitrary cancellations rather than pursue the offenders through the courts may acquiesce in the "request" for price protection.

More than 100 cancellations, 75 per cent of them unwarranted, have been reported to the National Association of Hosiery and Underwear Manufacturers since June 1. Lists of cancelers are distributed by the Association among members reporting them. Many of the cancelers assign no reason for repudiating their contracts. Some give as a reason unfavorable weather, unfavorable business conditions, overbought, carried too much merchandise over, cannot use the goods, etc.—any possible excuse that it might be possible to invent after cudgeling the brain in an effort to get out from under.

Although there has been a flood of cancellations of orders for woolen and worsted sweaters, none has been officially reported by the National Association.

Conditions in the sweater trade generally, except as to silks and worsteds, are not unlike those in an Ohio mill which, with a large output of cotton sweaters and manufacturing complete lines of shawls, capes, mufflers, knitted caps, etc., is sold so far ahead that reorders are being accepted only on the allotment basis. The mill's prices are up 15 to 20 per cent above the opening and the trade is offering duplicate business in considerable volume, raising no question as to values.

To safeguard itself against the possibility of overselling, the mill is notifying customers that it may not be able to make shipments on delivery dates and is asking for specific advices whether deliveries will be accepted as late as September. Unless advised in the affirmative, the mill will serve notice that it will reserve the right to cancel all or a part of an order. Merchants with goods on order can assure themselves of delivery only by promptly acquiescing in the late shipment proposal. Labor conditions have had much to do with the situation, which became complicated as a result of widespread freight embargoes.

Silk sweaters will drop materially, and worsted garments should show a decline as a result of a weakening in the wool market. This may be offset in part by slowing down on production as a safety expedient.

At present prices of artificial silk, it is stated by manufacturers, a 17-inch fibre boot stocking can be produced at less cost than the full mercerized. The question is, would a fibre boot stocking of the same price as mercerized not command more attention. If so, then mercerized must yield as a yarn for hosiery. In any event, it is felt mercerized hosiery will lag unless the wearer can buy it under one dollar a pair.

That some jobbers are running short on mercerized hosiery is indicated by several incidents, among which may be cited the reinstating of orders that had been cancelled. One manufacturer alone had cancellations of several small-lot orders, running from one to three cases, and accepted rather than engage in a controversy over such small quantities, afterward received requests that the orders be reinstated. This was done, the buyers in each instance agreeing to pay fifty cents a dozen more than the price in the original orders.

In the same week that a ladies' mercerized export reject was sold at $4.50 a dozen in New York a New Jersey manufacturer delivered an identical line for export at $5.75.

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ADVERTISING conserves the buyer's time by acquainting him with a product at his leisure, long before the buying need arises.

The Yarn Market.

After resisting the price reaction that has shaken so many markets severely during the past month, cotton yarns in Boston have now reached the stage where concessions are being made with more or less tenacity. Declines of from two to 50 cents a pound on fine counts have been reported during the month and in the case of 50s two-ply, which sold at $3.25 not so long ago, the quotation at this writing is $1.80. There is little pressure to sell, most of the little business done being handled by commission men.

In contrast to worsted yarns where conditions are practically stagnant, with mills operating on part time and in some cases shutting down for indefinite periods, cotton yarns have held up strongly until the period just preceding this writing. Coarse numbers have lately been in greater demand in line with the "signs of the times" which date back to the origin of the "overall movement." Quantities of yarns have been sold during the past few weeks at prices below their replacement value, inasmuch as spinners who are refusing to accept cancellations are booked well ahead and do not show any inclination to talk lower prices. In fine, the market in this vicinity is in a weak condition that borders on that which followed the signing of the armistice.

Transportation difficulties, while less acute than a month ago, are still hampering the trade and southern mills particularly are delayed in delivery to northern customers. New York has become literally "no man's land" as far as locating shipments are concerned. Embargoes and congestion are mainly responsible, with the long drawn-out longshoremen's strike adding a minor influence. Boston and New England buyers are finding it almost impossible to get shipments through.

Labor troubles have had no small influence on the chaotic situation, and the strike of weavers in New Bedford cotton mills resulted in many of those mills spinning more yarn than was needed. Much of this was turned on the market in competition with the regular supply sources. Practically all the large New England textile centers have suffered at some time or other in the past few weeks by labor difficulties, strikes, etc. At this writing however the situation has cleared almost without exception.

Owing to the dawning period of readjustment and dull, quiet markets, the diminution of the flow of cotton from the South into New England textile centers during the month of May, figures for which have only just been issued, has not had the effect on spinners that otherwise would be the case. Less than 100,000 bales reached New Bedford, Fall River, Lowell, Lawrence and Manchester during May, or 12,000 bales less than during the corresponding period of last year.

Despite increasing discouraging conditions the yarn trade still hold to optimism, and express the belief that prices will come back with a quick snap when the rush of orders that seems inevitable as soon as buyers long out of the market revive their interest begin to be received. The peak of yarn prices, however, is believed to have passed, and the trade acknowledge that the downward trend of things is greater than can be readily overcome.

Yarns for electrical goods including colored telephone

wire covering are in strong demand, but practically none is obtainable. Spinners of these numbers are booked months ahead, and a shortage of machinery for turning out the desired counts helps to prevent the supply catching up with the demand. This applies to 80s, 100s, 120s and 140s single. Hosiery and underwear yarns have been quiet all the month. The knitting trade feel more optimistic than most branches, and figure on new business at present prices, but recent developments fail to bring forth encouragement.

Mid-month quotations in the New England market on numbers most commonly used follow:

Southern Carded Single Cones.

10s	72 @74	20s	80 @82
12s	74 @75	22s	84 @85
14s	76 @77	24s	88 @90
16s	77 @78	30s	95 @$1.05
18s	78 @80	40s	$1.50@$1.55

Weaving Yarns.—Warp Twist.

10-2	73 @74	24-2	$1.05@$1.10
12-2	74 @75	30-2	$1.25@$1.30
14-2	81 @83	36-2	$1.80@$1.90
16-2	83 @85	40-2	$1.85@$1.90
20-2	95 @97		

A general price decline, which obtained throughout practically the entire month with little upward reaction, was experienced in the Philadelphia cotton yarn market in June. This condition was generally conceded to be the result of scant demand. However, this being the case, this month's market was contradictory to that of the previous four weeks, as regards prices, inasmuch as in May the selling end held stubbornly and bullishly refused to make concessions in the face of a feeble demand and negligible buying.

Not only did this business drought make for weaker prices, but other factors also contributed to this easing off in cost. In addition to scattered inquiry, yarns arrived at this market, both from the East and from the South, in much larger quantities than had been seen for many weeks. This, because of the slack buying, naturally loaded up the market and it was left up to those holding this stock as to how these surplus supplies were to be gotten off their hands. The logical answer was to make concessions. Then, too, a large number of dealers' price reductions were reported as being based, in every case, upon substantial concessions from spinners.

It was also reported from some quarters that prompt and nearby deliveries were promised. Some spinners, it was reported, seemed anxious to place yarns and offered delivery ranging from spot to shipments up through October.

On the whole, it looked as though the buyer who—seemingly—had been obdurate in his buying to swing prices to a lower level, was having his desires gratified and it was certainly thought that with price concessions and better delivery promised on some sides that business would again be placed on an ascending plane. However, the position of the buying end, during June, did not indicate any laxity on the part of this end of the market. And the absence of sales in some counts for extended periods and a very small turn-over in the ones that were active seemed to show that the manufacturers were not prone to buying because of this seeming afflux to their bearish attitude.

Combed peeler ply skeins and warps which a few months ago, it will be recalled, were known as the "aristocrats" of the cotton yarn list, because of the overwhelming demand for these counts and the subsequent high prices they commanded, experienced during June an unfamiliar neglect, with its correlative lowering of prices. These are merely a part of the whole but are cited because of the large difference between the June and the March, for instance, prices in these counts.

A new development which might be mentioned in connection with the stocking up of surplus supplies of yarn previously referred to, and which has in the past month come to the attention of this market, is the offering at auction of lots of yarn. During the month it was announced that a lot comprising 100,000 pounds of a certain count were sold at public auction to the highest bidder.

A notable feature of the decline which came in the yarn market last month was the fact that there were no sharp and sudden changes in prices. With the exception of some unusually low prices for what were apparently "distress" yarns, there were no extreme breaks and the progress downward was characterized largely by a constant easing-off in the prices of most counts. This, continued steadily until, say, the middle of July, will have a surprisingly reductive effect on prices. And, there is nothing to indicate that such will not be the case.

Following are recent quotations on the Philadelphia market:

Southern Single Skeins.

4s to 8s	71	10s	72
12s	73	14s	75
16s	77	20s	85
24s	92	26s	95
20s	$1.00		

Southern Single Warps.

8s	71 @72	10s	73 @74
12s	74 @75	14s	76 @77
16s	78 @79	20s	90
26s	$1.00	30s	$1.13
40s	$1.75		

Carpet and Upholstery Yarns in Skeins.

8-3-4 slack	60 @61
9-4 slack	60 @61
8-3-4 tinged tubes	57 @58
8-3-4 hard white warp twist	62
8-3-4 hard twist waste	57

Southern Two-Ply Skeins.

8s	71 @72	10s	72 @73
12s	73 @74	14s	76 @77
16s	79 @80	20s	87
24s	95 @$.100	26s	$1.05
30s	$1.10	40s	$1.65

Southern Two-Ply Warps.

8s	71 @72	10s	73 @74
12s	76 @77	14s	77 @78
16s	82 @83	20s	90
24s	$1.03	26s	$1.05
30s	$1.15	40s	$1.80

Two-Ply Combed Peeler, Skeins and Warps.

20s	$1.40	24s	$1.60
30s	$1.75	40s	$1.90
50s	$2.30@$2.40	60s	$2.50@$2.60
70s	$3.00@$3.10	80s	$3.50

Southern Frame Spun Carded Yarn on Cones.

8s	68	10s	69
12s	70	14s	71
16s	72	18s	75
20s	76	22s	77
24s	83	26s	85
30s	92	40s	$1.40
30s tying-in			.85
30s double carded			$1.05

Northern Mule Spun Carded Yarn on Cones.

10s	80	12s	82
14s	83	16s	84
18s	86	20s	89
24s	92	26s	$1.00
30s	$1.10	40s	$1.50

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	$1.12	12s	$1.14
14s	$1.16	16s	$1.17
18s	$1.18	20s	$1.20
22s	$1.23	26s	$1.32
28s	$1.35	30s	$1.38
36s	$1.75	38s	$1.80
40s	$1.85		

The world is looking for the man who can do something, not for the man who can "explain" why he didn't do it.

Among the Knitting Mills.

John K. Stewart & Sons, Amsterdam, N. Y., manufacturers of knit goods, are considering plans for the erection of a new branch mill at Corinth, N. Y. The proposed plant will be about 80 x 100 feet, and is estimated to cost about $60,000. It will be devoted to the manufacture of underwear specialties.

The Nelson Knitting Company, Rockford, Ill., manufacturer of seamless cotton hosiery, is considering plans for the erection of a new four-story and basement plant, 100 x 240 feet, to cost about $40,000.

The Howard Hosiery Mills, Hagerstown, Md., is reported to be planning for the rebuilding of the portion of its plant destroyed by fire on June 1, with a loss estimated at about $15,000.

The New Idea Hosiery Company, Harrisburg, Pa., is arranging for an increase in its capital from $100,000 to $250,000 for proposed expansion.

The American Slip-On Company, Amsterdam, N. Y., recently incorporated with a capital of $20,000 to manufacture knit goods, is planning for the establishment of a local plant. Details of the proposed mill are now being arranged.

The Paramount Knitting Company, Chicago, Ill., is planning for the erection of a new branch mill at Hartford, Wis.

The Pawtucket (R. I.) Hosiery Company, manufacturer of cotton hosiery, etc., has filed plans for the erection of a one-story, brick addition to its plant, 30 x 75 feet.

The Eskimo Knitting Mills, Philadelphia, manufacturer of knit goods, has acquired property to be used for general expansion.

The Fox Knitting Company, Philadelphia, is planning for the establishment of a new mill for the production of seamless hosiery.

The Wynantskill Manufacturing Company, Troy, N. Y., has completed plans for the erection of a three-story, brick addition to its plant for increased manufacture. The structure is estimated to cost about $15,000. The company specializes in the manufacture of fancy knit goods, etc.

The Anapoll Knitwear Mills, New York, has been incorporated with a capital of $30,000 to manufacture knit goods of various kinds. Maurice Rubinger, Joseph Fine and Joseph Jaffe, 22 Ludlow Street, are the incorporators.

The E. Sutro & Son Company, Philadelphia, Pa., manufacturer of hosiery, has arranged for the erection of a new branch plant at York, Pa.

William A. Lawrence & Company, Poughkeepsie, N. Y., will soon occupy its new two-story plant, recently constructed. The mill will be two-story, 60 x 110 feet, and will be equipped for the production of knitted goods of various kinds.

The Oneita Knitting Mills, Inc., Utica, N. Y., has increased its capital from $1,600,000 to $1,800,000 for proposed expansion.

The Sinking Spring (Pa.) Knitting Mills is reported to be planning for the rebuilding of the portion of its plant recently destroyed by fire. The company specializes in the manufacture of hosiery.

The Star & Crescent Company, Philadelphia, Pa., manufacturer of knit goods, has acquired property for future extensions. Plans have also been filed for extensions and improvements at the existing works.

Greenspan Brothers, Inc., Mount Vernon, N. Y., has been incorporated with a capital of $25,000 to manufacture knit goods. Samuel Meislan, Benjamin and Israel Kaufman, Mount Vernon, are the incorporators.

The F. Y. Kitzmiller Company, Reading, Pa., has perfected plans for the erection of a new mill, to be equipped for the manufacture of hosiery. The structure is estimated to cost about $60,000.

The Pyramid Mills, Inc., have been incorporated with a capital of $60,000 by B. H. McGinnis, J. S. Calhoun and P. C. Flemister, to erect a knitting mill at Cartersville, Ga. This building will be 200 x 60 feet. All machinery has been ordered; the daily output is expected to be 100 dozen boys' union suits.

A new hosiery mill, to be known as the McDowell Hosiery Mill, is being erected at Marion, N. C. The owners are J. E. Kanipe, C. F. James and L. R. McCurry. Machinery is being installed.

The Talladega (Ala.) Knitting Mills, capitalized at $40,000, recently purchased the Hicks Hosiery Mill, of the same place. C. N. Lanier is president, Miss Grace Jemison, secretary, and A. W. Hardin, treasurer.

A 100 x 40 foot structure will be erected by the Vance Knitting Co., recently capitalized at $40,000, at Kernersville, N. C. This mill will be equipped with 50 knitting machines, capable of turning out 500 dozen pairs of hose daily.

A charter has been granted to the Guilford Hosiery Mills, Inc., at High Point, N. C. The authorized capital is $125,000. The promoters include T. E. Kearns, A. M. Rankin and E. T. Kearns.

The Wood Hosiery Mills have been incorporated at Bristol, Va., with a capital stock of $50,000. J. H. Wood is president and J. L. Wood secretary.

The O'Brien Knitting Mills, Elkin, N. C., have been organized with a capital of $300,000 by H. G. Chatham, of Elkin, and W. L. O'Brien and P. H. Lehman, of Winston-Salem. The company will erect several mills, the first of which will be located at Elkin, and will also erect a finishing plant in Winston-Salem.

The Dalton (Ga.) Hosiery Mills are building an addition to house 20 new knitting machines.

The capital stock of the Moorhead Knitting Co., Harrisburg, Pa., has been increased from $1,000,000 to $5,000,000.

An increase in the capital stock of the Excelsior Knitting Mills, Union, S. C., making the present capital $500,000, has been authorized by the secretary of state.

The Quality Textile Mills have been organized at Niota, Tenn., by Harry Burns and H. A. Collins, with a capital of $25,000 and will erect a two-story mill for the manufacture of men's silk hosiery.

The Holston Manufacturing Company, which has recently sold its mills in Lenoir City, Cleveland and Morristown, Tenn., to the Scott-Kitzmiller Corporation, is preparing to build a new knitting mill at Knoxville, Tenn., with a daily capacity of 2,000 dozen pairs of hose. It is planned to have the new plant in operation by January 1, 1921.

It Isn't what we say about

Liquid EBG Chlorine

that counts half as much as what it proves to those who use it.

If you are a wide awake mill man the experience of CHENEY BROTHERS, South Manchester, Conn., will interest you. They write under date of April 15, 1919:

"We have thoroughly tested out your Liquid Chlorine on a practical scale and find that it is very satisfactory. We anticipate that it will not only give us a considerable saving in the price of our bleaching, but it also gives us a better white than our old method with bleaching powder, and finally the bleached goods give much better results in the dye bath."

May we send you full particulars?

Demonstration at your mill on request.

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Pioneers and Leading Manufacturers of Liquid Chlorine

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THEY STOP FIRE

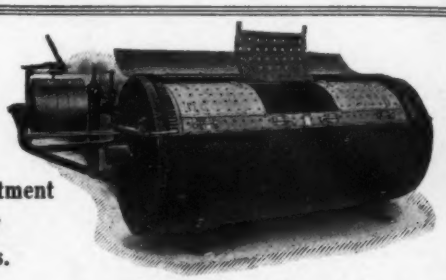
In addition to being fire proof themselves Cortright Metal Shingles actually stop fire.
They are made in red and green painted tin—also two galvanized kinds.
Our book "Concerning That Roof" is illustrated with photographs of buildings roofed with Cortright Metal Shingles. Let us send it.

Dept. F.

CORTRIGHT METAL ROOFING CO.
Philadelphia *Chicago*

STANDARD SINCE 1887

100 Pounds Each Compartment Capacity 1200 Lbs. Per Day.



Other sizes, also steel storage tanks built to order.

IMPROVED STEEL ROTARY DYEING MACHINE

Manufactured by

ROME MACHINE & FOUNDRY CO. - ROME, GA.

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MAPLE FLOORING

Cleaner floors and longer wear are assured you with our quality maple. Prompt service. Delivered any time and anywhere. Ask for our prices on flooring.

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we have manufactured

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is made right by men who *know how* to satisfy the demands of the textile field.

COTTON, WOOLEN AND WORSTED
mills find them just soft enough to mark the finest materials without injury and yet hard enough to wear well.
Contain no oil or grease.

LEAVE NO STAINS AFTER BLEACHING
Fifteen colors and white.
Write for color card and prices.

Lowell Crayon Company
LOWELL, MASS.
Original Makers of Mill Crayons.

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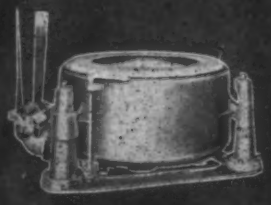

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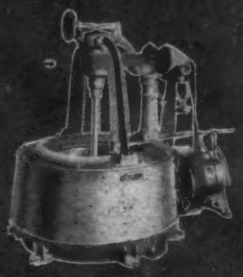
HYDRO-
EXTRACTORS



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has become more insistent each day. In order to be sure of prompt delivery your orders should not be delayed.

Tolhurst Hydro-Extractors are provided for countershaft or motor drive, from above or below. Baskets 12″ to 72″ diameter.

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Established 1852 **New York Office: 111 Broadway**

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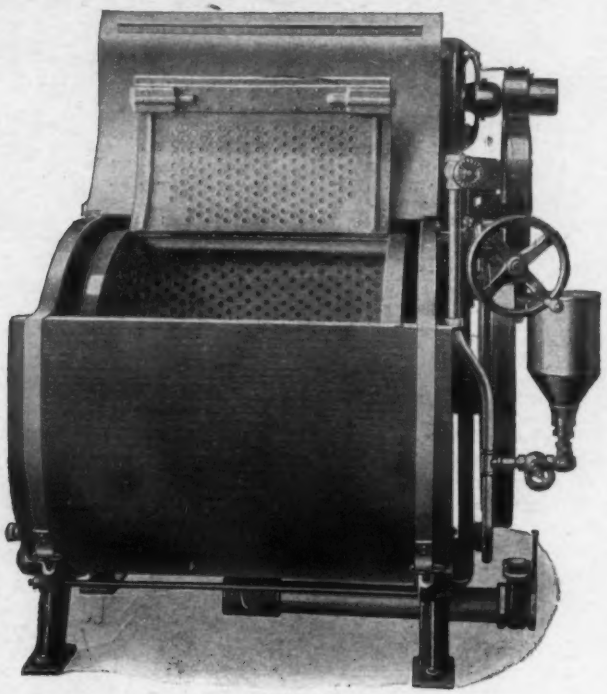
The cylinder of the American Rotary Dyeing Machine is divided into three parts, each one independent of the other.



The American Rotary Dyeing Machine

Hosiery Dyed Without Roughening

The loss of beauty is prevented, and more uniform dyeing is secured in the American Rotary Dyeing Machine by reason of its 3 "Y" shaped compartments in the cylinder—each totally independent of the others.

The drop has been fully eliminated, yet the hosiery is more thoroughly dyed—it receives two squeezes and two spreads in each revolution. The dye is forced into the innermost fibers.

Because of these partitions, the machine is easier to load and unload—the goods are literally carried on a shelf; no stooping and reaching into the bottom of the machine is necessary.

You will find the American Rotary Dyeing Machine a real step forward in your plant. It will improve your dyeing process and retain the original fine natural finish. Write and we will give full information.

The American Laundry Machinery Co.

Specialty Department C

Cincinnati, Ohio

Set Machines to Do The Work of Men

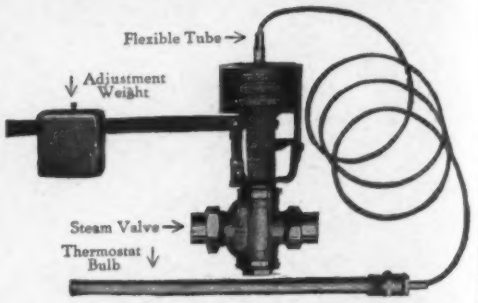
The cost of labor is so enormous that it is wisdom to use machines wherever we can.

It is possible to control practically all heat processes, so that the human element is eliminated, through the use of a

Powers Heat Regulator

There is a Powers Regulator for nearly every place where you use heat.

From our more than thirty years of experience in temperature control, we can give you intelligent advice on how to save labor, fuel, and time, assuring at the same time a more uniform output.



The Powers Regulator No. 11.

Our No. 11 Regulator is entirely self-contained, requiring no outside power for operation.

Automatic, reliable, and accurate. Peculiarly adapted to the control of liquid temperatures in hot water tanks, dye kettles, size boxes, slashers, etc.

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Specialists in Automatic Heat Control

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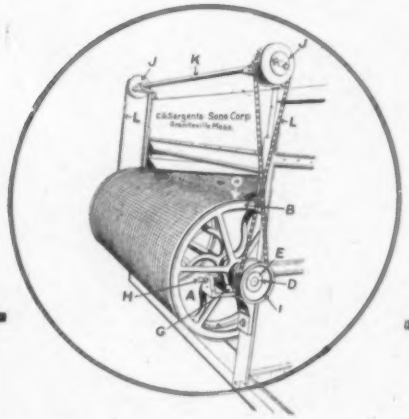

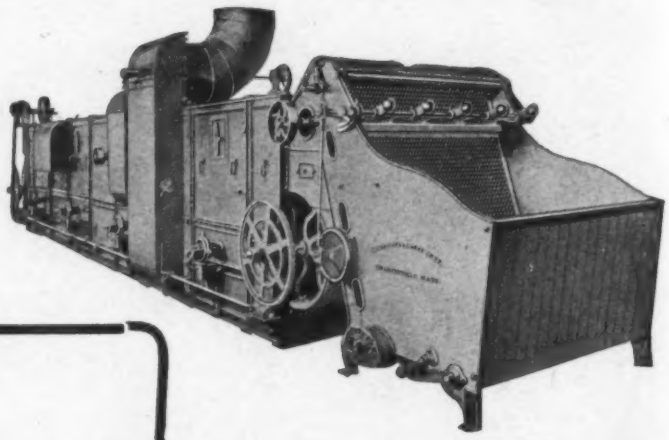

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In the development of a continuous dryer, probably more thought has been given to the design of the apron than to any other one part of the machine.

Notwithstanding the many patents which we hold on aprons, in which chains, cross-bars, and other complications are used, the plain wire cloth type has proven best. The simplicity of this construction, its low cost of maintenance or replacement as compared with complicated mechanisms proves that simplicity is the best in the long run.

The freedom of possibility for mixing lots, colors or different grades and the ease with which all the stock can be stripped from the apron as it emerges at the doffer end of the dryer, are also advantages of the plain apron.

The Automatic Apron Control (shown) increases the utility of the wire cloth apron by providing a sensitive and automatic adjustment. It thus maintains the apron constantly in its proper path of travel.

Let us tell you more about the superior features of the SARGENT DRYER. Write today for catalog.

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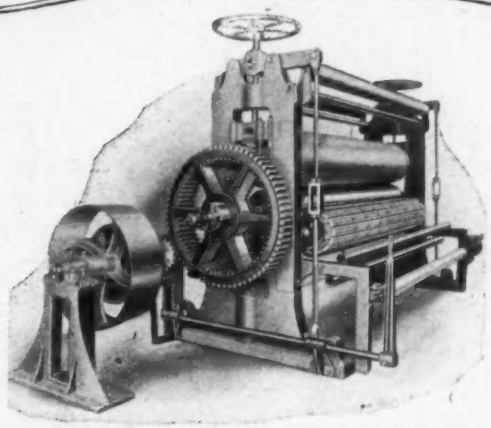
Sargent Dryers

1820 A CENTURY of SPECIALIZATION 1920



Calender (Three-Roll) for Cotton Piece Goods

HAVING specialized in finishing machinery for a century, we feel we are competent to assist you in getting better results in the appearance of your product.

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THE BUTTERWORTH LINE INCLUDES:

Bleaching Machines	Hydraulic Presses	Mangles (all kinds)
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COCKER HOSIERY DYEING MACHINE

THIS machine has been thoroughly tested out with all colors and under all conditions, and is guaranteed to give the very best results possible in the dyeing of hosiery.

The stock is carried in four perforated metal containers equipped with one removable head on each container, and the containers mounted on Spiders in such a manner as to permit of their being loaded and unloaded quickly from the machine.

The Spiders carrying these containers are revolved in the vat *in one direction.*

Machines are furnished with either belt or motor drive.

Points of Advantage in This Machine That Must Be Considered

1st—Matting and chafing of the stock is entirely eliminated.

2nd—Percentage of re-dyes is reduced to a minimum.

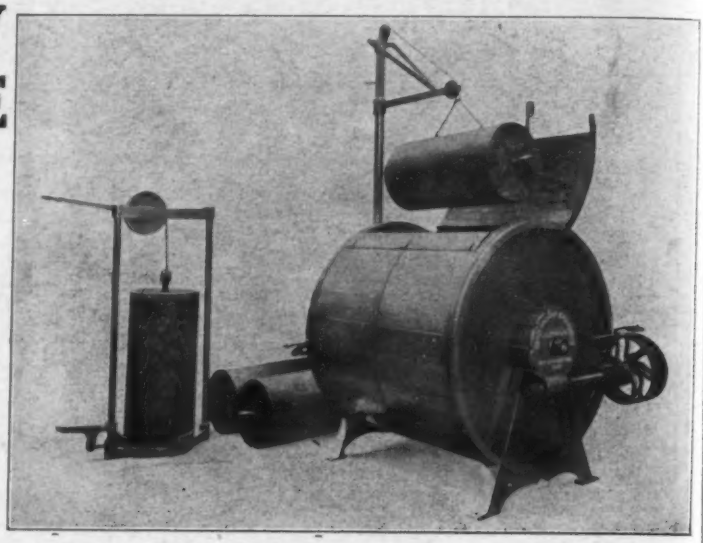
3rd—Different sizes and descriptions can be handled in one dyeing without confusion.

4th—Time required for loading and unloading machine reduced to a minimum.

5th—Absolutely level dyeings on all colors.

6th—Minimum of power required for operation.

For further particulars and prices write or wire.



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Fletcher 12" Laboratory Centrifugal

A small compact and very powerful machine adapted to all laboratory work, and suitable for experimental purposes of every character.

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The need for a basic standard brought the perfecting of this method of determining fastness to light of colors and dyestuffs.

The FADE-OMETER was designed solely to fill a need for a standardized light equal in intensity to sunlight and available at any period of the year.

Elimination of the old time sun testing method has brought about a revolution of vast import to the textile manufacturer who using the Fade-ometer standard, reproducible tests can now be made in a few hours.

Unequaled for comparative service. Write us for fuller information in regard to this instrument.

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Proctor Yarn Dryer (Automatic Conveyor Type) for cotton, mercerized, silk, wool, and worsted yarns.

Our Policy

Every "Proctor" Textile Dryer is built as though the whole reputation of Proctor & Schwartz, Inc., depended upon its individual excellence. Every operation, every piece of material is considered part of one great plan, which has for its ultimate object the realization of every legitimate economy, and the nearest possible approach to perfection in drying the customer's product.

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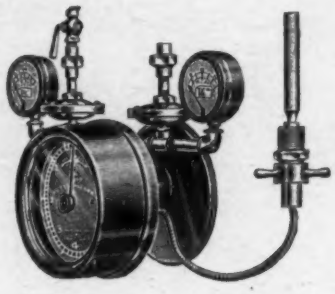
"Proctor" DRYERS

102



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Slashing is not done "as well as it can be done" until the right temperature is evenly maintained during the entire operation.

You're scheduled for a lot of trouble, especially in weaving, if beams of improperly slashed warp go to the weave room.

Light sizing produces a warp of insufficient strength, causing frequent breakage in the loom; heavy sizing gives harsh and rough warp, resulting in excessive chafing and shedding in the looms. Both of these conditions are due to fluctuating temperature in the size box. A uniform sizing temperature can be automatically maintained by using the TAG Perfect Temperature Controller.

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National Colors Are National Assets

This progression from coal to color calls for many **intricate and carefully worked out steps,** varying with each one of the nearly 300 **individual dyes** made by the

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The interlocking of these steps in relation to each other so as to insure **standardized results** is the triumph of American chemists and engineers in the establishment of an **American Dyestuff Industry.**

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MINEROL "F"

For Knit Goods

"We are pleased to say that adding the *Breton Minerol "F"* in our boil has given us a softer finish."

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NOPCOCASTOR is not only a truly superior Sulphonated Pure Castor Oil, but is absolutely 100% up to specified strength.

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Very truly yours,

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National Oil Products Co.

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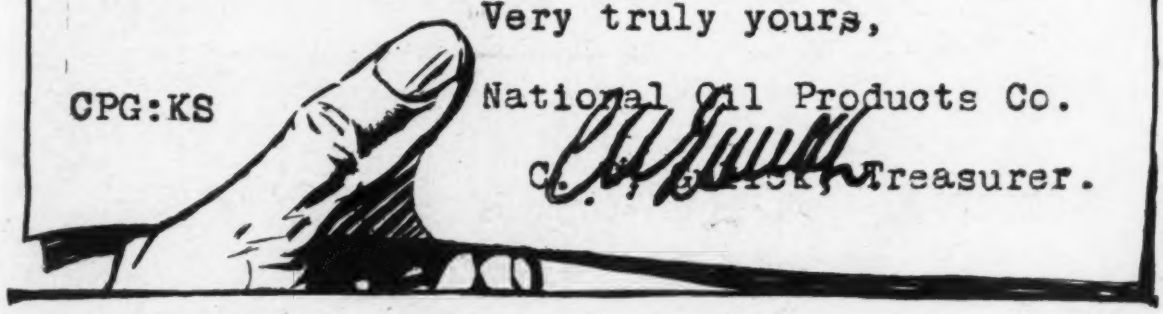

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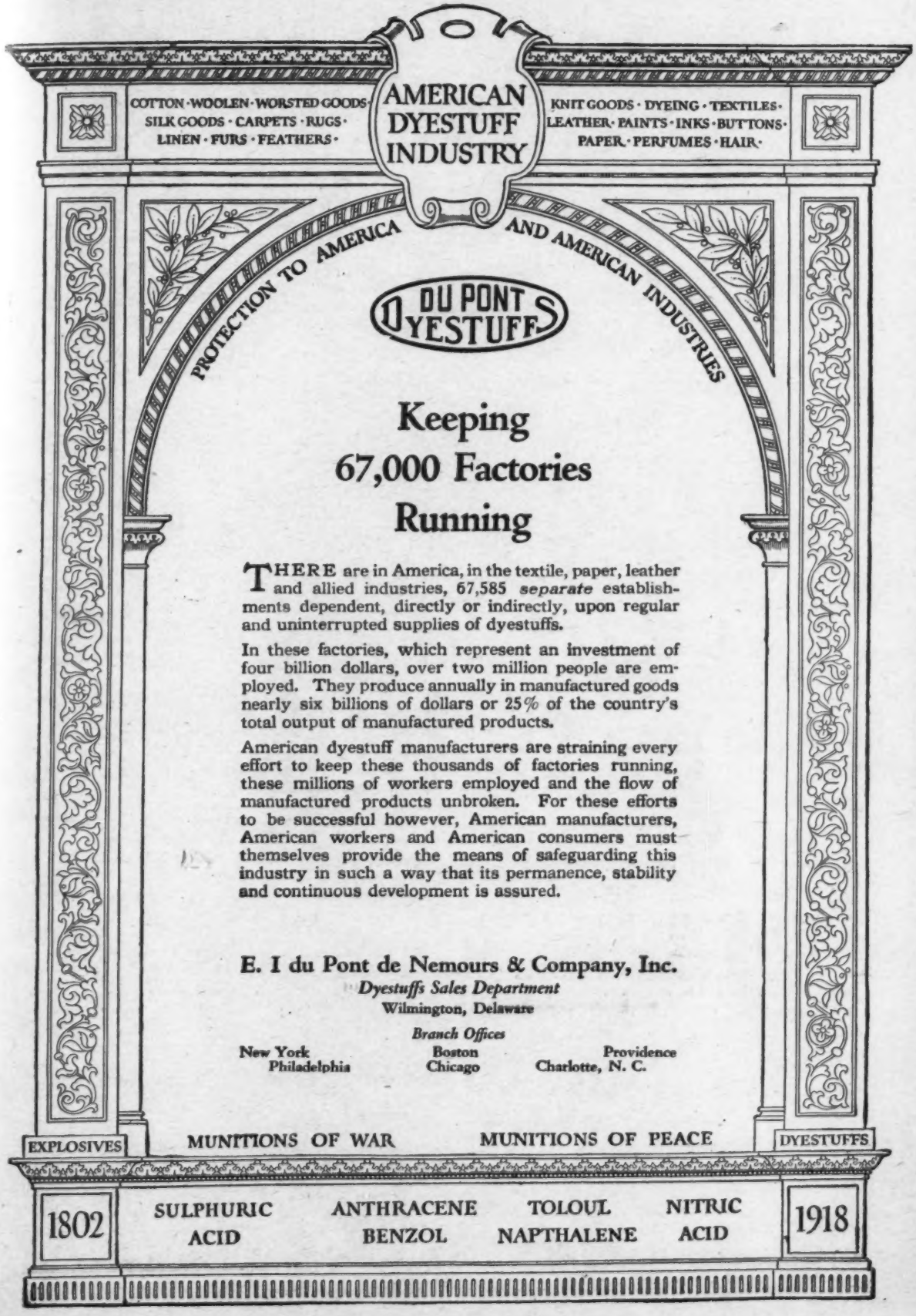
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THERE are in America, in the textile, paper, leather and allied industries, 67,585 *separate* establishments dependent, directly or indirectly, upon regular and uninterrupted supplies of dyestuffs.

In these factories, which represent an investment of four billion dollars, over two million people are employed. They produce annually in manufactured goods nearly six billions of dollars or 25% of the country's total output of manufactured products.

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"DEVELOPENE"

Turns a *Rusty Black* to a *Lustrous One.*

THERE is no slight of hand connected with it. Send a pair of stockings, a skein of yarn or a sample of fabric, which has been dyed black, washed but not finished, to our Laboratory.

We will finish it with "Developene" and return to you. There will be such an improvement you will immediately want "Developene" for finishing your goods.

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Salicylic Acid Prevents Fermentation of Size

Sole Manufacturers of Hydroxy Oil and Kali Chlorine Neutralizer—the Superior Anti-Chlor. Formaldehyde

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Importers and Manufacturers of

STARCHES, GUMS, DEXTRINE, ALIZARINE ASSISTANT, SOLUBLE OIL, SOAP

And Every Known Material from Every Part of the World for Starching, Softening, Weighting and Finishing Yarn, Thread or any Fabric.

Special Attention Given by Practical Men to Specialties for

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Cotton, Woolen and Worsted Fabrics combining the latest European and American Methods. We Believe There is No Problem in

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FORMULAS for the best method of obtaining any DESIRED FINISH on any fabric cheerfully given.

SURPASS CHEMICAL CO. ... AUTOGYP PROCESS OF DYEING ... AUTOGYP ... ALBANY N.Y.

DYEING and BLEACHING In *ONE* Liquor

Manufacturers of Cotton Underwear, Gloves and Hosiery who have been in the habit of dyeing Egyptians and other light shades over a lime bleach bottom have been quick to adopt the Auto-Gyp Process of Dyeing. They have eliminated the use of chloride of lime with its attendant worries and dangers and perform the whole operation of bleaching and dyeing in one liquor. This process eliminates all specks, motes, leaf and shives, preserves tensile strength, saves shrinkage, steam, labor, water and chemicals. The process requires only three hours time to turn out a batch of goods where it formerly took 6 hours.

Let us prove our claims at our expense in your plant. Write today for full information.

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Represented in the South by
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Process of Dyeing

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The experience of critical operators has shown this popular brand to be the most efficient sizing agent, both for additional WEIGHT and increased STRENGTH of Warp. Penetration accomplishes these important results.

EAGLE FINISHING is specially manufactured to cover a wide range of fluidities to meet the needs of all classes of weaves.

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"DYESTUFF DEPARTMENT"

Works at:

GRASSELLI, N. J. ALBANY, N. Y.

SULPHUR COLORS: Black, Blue, Brown, Green.
Direct Cotton Colors, Acid and Chrome Colors
MONOPOLE BRILLIANT OIL
Bichromate of Soda Sodium Sulphide
Zinc Dust, Chemicals and Acids

BRANCH OFFICES:

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The Grasselli Chemical Company, Limited

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Sole Selling Agents for Essex Aniline Works, Inc., Boston, Mass.

JACQUES WOLF & CO.

Manufacturing Chemists & Importers
MAIN OFFICE and WORKS: PASSAIC, N. J.
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HYDROSULPHITES
For All Purposes

All Sizing and Finishing Products for Cotton

Bensapol
Bleaching Oil
Cream Softener
Glasgow Sizing
Levuline
Soluble Oils
White Finish

MONOPOLE OIL
Reg. Trade Mark No. 70991

TRAIN LOAD

During one week of May, this Company shipped the equivalent of a train load of its ATLANTIC BLACKS from its Works at Burrage, for distribution amongst its various customers throughout America.

The Atlantic Company would not be called upon for such enormous quantities of its ATLANTIC BLACKS were they not the accepted standards of the Sulphur Blacks of the world.

Atlantic Dyestuff Company

WORKS: PORTSMOUTH and BURRAGE

MAIN OFFICE:
BOSTON
88 AMES BLDG.

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250 West 13th St.

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1330 Real Est. Trust Bldg.

CHARLOTTE
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227 W. Randolph St.

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Fast Vat Dyes

Made by

THE SOCIETY OF CHEMICAL INDUSTRY---IN BASLE, SWITZERLAND

SOLD IN AMERICA

during the whole period of the war by

A. KLIPSTEIN & COMPANY, New York

and obtainable now in rapidly increasing quantities.

These Dyes are Faster than Indigo

They are sold under the registered trade marks of

"CIBA" and "CIBANONE" DYES

and include every necessary shade of color. For example—
"CIBA" Blue, Violet, Red, Scarlet and Bordeaux
"CIBANONE" Green, Yellow, Orange

The Textile trade of America
need not suffer for the lack of

FAST VAT DYES

Quotations and samples on application

A. KLIPSTEIN & COMPANY

644-652 Greenwich Street, New York City

Mercerizing Gassing Bleaching

We have a new and strictly modern plant for mercerizing, gassing and bleaching.

Located as we are in the center of the combed yarn spinning industry of the South, we are enabled to furnish you with the highest quality processed yarns in all numbers.

The American Processing Company

Mount Holly, N. C.

NEW YORK REPRESENTATIVE:
H. B. ROBIE,
No. 346 Broadway,
New York City.

SELLING AGENTS,
THE RIDDLE COMPANY,
Mariner & Merchant Bldg.,
Philadelphia.

VICTOR MILL STARCH

The Weaver's Friend

It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

THE KEEVER STARCH COMPANY, Columbus, Ohio

Southern Agent: MR. JAMES H. MAXWELL, Greenville, S. C.

If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience

Boston Philadelphia Chicago Columbus, Ga.

DOW Indigo

Midland Vat Blues

Thio Indigo Red B

Aniline Dyes and Chemicals, Inc.

NEW YORK

Soluble Grease

To make the stock yarn or warps Run Smooth, regardless of dyes that make the Cotton Fibre harsh.

BOSSON & LANE

ATLANTIC MASS.

RUBBER COVERED ROLLS

AND

POWER WRINGERS

With a thorough knowledge of the service required by textile mills and the facilities for producing the **HIGHEST QUALITY** obtainable, we are splendidly equipped for supplying RUBBER COVERED ROLLS and POWER WRINGERS of any size for every purpose.

WE ARE RUBBER ROLL SPECIALISTS

Our interlocking sectional ring roll for wool scouring is the BEST and most serviceable on the market today.

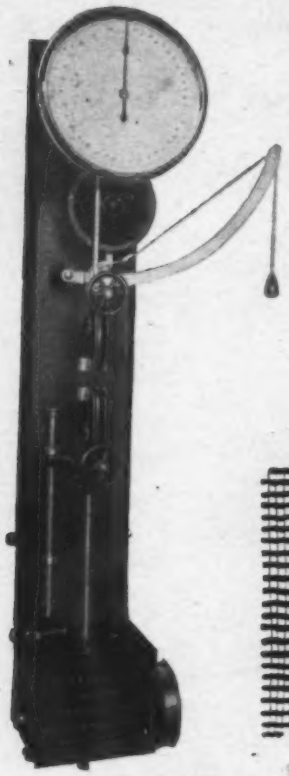
Guaranteed to last one year running days and six months running days and nights.

Write for illustrated booklet on our products.

THE AMERICAN WRINGER CO.

DEPT. F. WOONSOCKET, R. I.

Scott Testers



To Err Is Human

—therefore Scott Testers have eliminated the human element. They are power-driven and automatic and as a result are supremely accurate.

Whether for testing delicate yarns or sturdy woven fabrics, Scott Testers are uniformly exact in every detail.

Being simple in construction, repair bills are almost unknown with the Scott Testers.

Made in vertical and horizontal types of various capacities for every requirement.

Illustrated literature supplied on request.

HENRY L. SCOTT & CO.
PROVIDENCE, R.I.

An Overseer at Every Machine

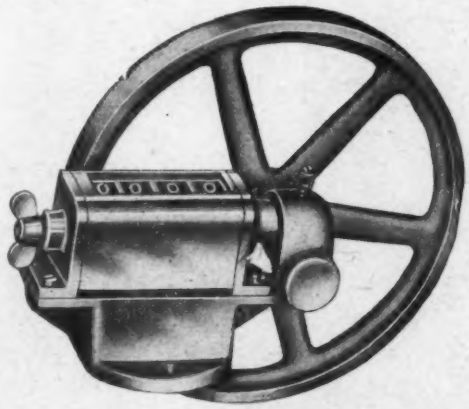
If you put an overseer at every machine to keep up the operative's work, you would get pretty close to the complete supervision that **Veeder Counters** would give you.

You would have such a watch over production that every run of work could be kept up to schedule at every point in your mill.

You can *get* this result of complete supervision with the overseers you *have*—when they're aided by

Veeder COUNTERS

Less "bossing," less antagonizing of help; more accurate reports on the workers; more production.



The above **Set-Back Yardage Counter** measures the yardage of output of finishing and inspection machinery, where makeshift devices or costly measuring instruments have been used. The straight-face friction wheel ½ yard in circumference is geared so it measures in units of one yard; will not slip on the finest fabrics. Counter reads in plain figures, and can be set back to zero from any figure by turning knob once round.

Write for copy of the Textile Counter booklet, showing counters for all textile machine requirements.

The Veeder Mfg. Co.

6 Sargeant St., Hartford, Conn.

MOSSBERG

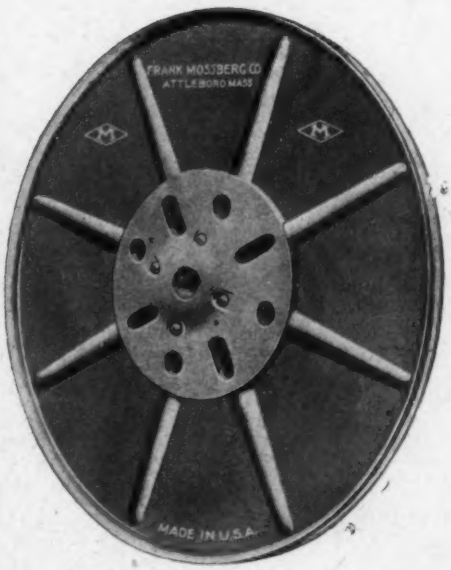
STEEL BEAMS AND SPOOLS

LESS EXPENSIVE!

While undoubtedly superior in every way to wood or cast iron, Pressed Steel Beams, Reels, and Spools, because of the saving in repairs, and replacements are the least costly.

Mossberg Pressed Steel Construction is being used by mills the country over with a resulting saving of money and time.

We will gladly send you our catalogue of Pressed Steel Beams, Reels, and Spools. This book takes care of practically all winding and reeling requirements.



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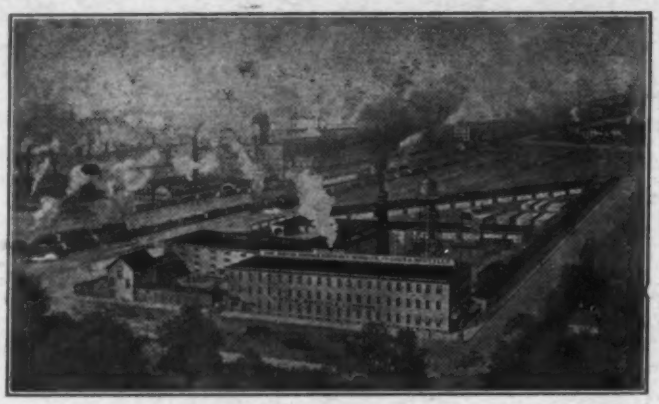
ATTLEBORO, MASS., U. S. A.

The David Brown Company

Factories Lawrence, Mass. U. S. A.



High Grade Bobbins, Spools, Shuttles and Skewers.

Facilities are the Best.

Correspondence Solicited.

SPOOLS

Let us submit prices and samples on WARPER and TWISTER SPOOLS. Plain wooden head and metal shield. A list of Southern Mills using spools given on request.

Greenville Spool & Mfg. Company

Greenville, S. C.

WHILE YOUR MILL IS MAKING SUBSTANTIAL PROFITS

is the time to equip with loom-harness whose service is measured from year to year instead of month to month.

"DUPLEX" FLAT STEEL HARNESS can show records of ten to fifteen years service at an average cost of ONLY 10c to 12½c PER SHADE PER YEAR with high cloth production and low percentage of seconds.

Let us quote you.

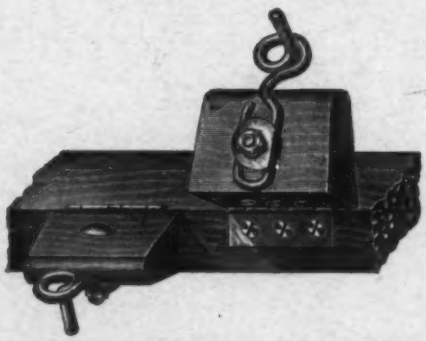
STEEL HEDDLE MFG. CO.

GREENVILLE PHILADELPHIA PROVIDENCE

Southern Office

111 Washington St. Greenville, S. C.
Hampton Smith, Southern Manager.

The Palmer Adjustable Thread Guide



For Ring Spinning and Twisting Frames

Easily adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

Patented and manufactured by

THE I. E. PALMER COMPANY

Middletown, - - - Connecticut

Receptacles

THAT SERVE YOU BEST

Diamond Fibre Receptacles are an efficient and economical transportation system. They are made of Diamond Fibre, which is tough as horn and almost as hard as iron, yet lighter than aluminum. This material does not dent, crack, break, or splinter. A superior material and superior construction provide an unusual combination of great strength and durability with light weight and convenience.

Your product is protected when handled in these receptacles, because the interior construction is smooth and flawless. For example, Diamond Fibre Seamless Roving Cans are in great demand by mills because there is not a seam or projection to catch a particle of the contents. Furthermore, the close texture and glossy surface of the fibre Receptacles preserve their fine appearance under the hardest usage because the color is **in-built** and the surface does not chip, nick, or wear off.

There is a Diamond Fibre Receptacle for every mill need. Our roving cans, mill boxes, and baskets, doffing cars, gill cans, trucks, barrels, etc., are leaders in their respective fields. Standard sizes and designs, or made to any specifications. Write us your requirements and let us co-operate.

We maintain an office in Greenville, S. C., to serve the Southern mills.

Send for Special Catalogue.

Diamond State Fibre Company

Dept. WZ

BRIDGEPORT, PA., (Near Philadelphia)

In Canada, Diamond State Fibre Co. of Canada, Ltd., Toronto.

Modern Playgrounds Better Communities

Leading industrial concerns recognize the value of the playground, not only to their community, but to their institution as well. Add to the health and happiness of an employe's growing children, and you give to that employe an added happiness and contentment that he carries with him to his work. You promote loyalty, good will and genuine interest.

MEDART
PLAYGROUND EQUIPMENT

For 50 years the Medart Company has been manufacturing and perfecting gymnasium apparatus for vigorous men—an experience that has especially fitted it for the leadership it has always maintained in the development of playground equipment best suited to promote those bodily and mental qualities which mold today's childhood into tomorrow's man- and womanhood.

Send for Catalog "L."

Catalog "L" fully describes Medart Playground, Swimming Pool, Gymnasium and Locker Room Equipment. Contains valuable suggestions for playground installations. It will be sent gladly to anyone requesting it.

Fred Medart Manf'g. Co.

Potomac & DeKalb Sts.

St. Louis, Mo.

Gordon Lewis, District Manager, Walton Bldg., Atlanta, Ga.

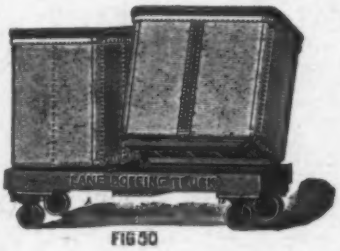


FIG 50

LANE

Canvas Mill Boxes and Trucks

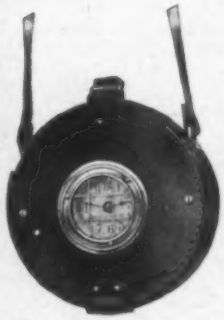
FIG 20

Lane Doffing Trucks are made to wear. Heavy Duck and Spring-steel frame permit rough handling. Light weight, easy running. Mounted on our improved Thread-guard Casters, either stationary or swivel.

Standard American Equipment

Lane Canvas Mill Boxes are free from all roughness, thus reducing waste. Rim bound with tough leather. Shoes of hard maple, renewable.

W. T. LANE & BROTHER, Manufacturers **Poughkeepsie, N. Y.**



SPILT MILK

The day after the fire it does no good to wonder where the watchman was when the fire started, and to wish you had had

ECO WATCHMAN'S CLOCKS

You know the old saying: "There's no use in crying over spilt milk." When it costs so little to insure proper watching, why take chances?

ECO WATCHMAN'S CLOCKS mean that your watchman must do the work you pay him for and expect of him. He must watch your mill as you would do it yourself.

Eco Clocks are very cheap insurance.

ECO CLOCK COMPANY
196 Congress St., Boston, Mass.
24 Cortlandt St., New York
Southern Department: 23 Walton Bldg., Atlanta, Ga.

AMERICAN SUPPLY COMPANY

PROVIDENCE, R. I.

MANUFACTURERS OF

Loom Harness,
Weaving Reeds,
Oak Tanned Leather
Belting, Strapping,
Etc.

We make a specialty of Harness for Warp Drawing Machines

NOTE—No orders too large for our capacity. None too small to receive careful attention.

Leatheroid
MILL RECEPTACLES

The Truly Permanent Fibre Cars

Leatheroid No. 3 All Fibre Car. Solidly Built. All wearing surface protected.

Leatheroid cars, as all Leatheroid receptacles, are made of "Leatheroid"—the most durable and toughest, smooth fibre known, and the other parts are chosen with care, and put together right.

Leatheroid Cars stand the heaviest loads and roughest usage day after day, year after year, and then show very little effects of wear.

Leatheroid Cars, Roving Cans, Boxes, Baskets, etc., are made in all sizes and shapes.

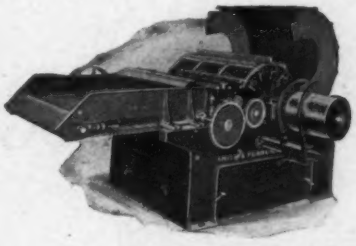
Sold by Leading Southern Mill Supply Houses.

Rogers Fibre Company
Leatheroid Sales Division
1024 Filbert Street, Philadelphia

Leatheroid No. 2 Steel-Clad Car. Nothing Equals it for Construction, Finish and Serviceability.

SMITH & FURBUSH
MACHINE CO.
PHILADELPHIA, PENNA.

Specialists in machinery for working all kinds of Waste Products. Complete equipment for coarse yarns, etc., from waste. Shoddy, Felting and Woolen machinery.



Jute Picker
Send for Circular S-166

This machine is used for shredding or hackling out Gunny and Burlap bagging.

It is used as a part of our outfit for the manufacture of gunny sacking from scrap bagging.

Strength With Lightness

Ideal construction always combines maximum strength with minimum weight.

KEYSTONE "PEERLESS" SEAMLESS ROVING CANS

are strong—yet light.

Keystone Peerless Fibre, which we make ourselves, exceeds in toughness, serviceability and long-lasting strength any other fibre twice as heavy.

Easy to handle, hard to destroy, Keystone "Peerless" Seamless Roving Cans are the most efficient you can buy.

Orders filled through any responsible mill supply house or direct.

Write for our book on Keystone Holloware Mill Equipment.

Keystone Fibre Company
Box 144 Yorklyn, Delaware

THIS
CONVINCING COMPARISON
SHOWS THE SUPERIORITY OF

SIGNODE SYSTEM

OVER THE USUAL BALE TIE.
LET US SEND YOU FULL DETAILS
SIGNODE SYSTEM, INC.
CHICAGO ATLANTA
Boston New York Philadelphia San Francisco
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5/8" x .015 SIGNODE TIE	COSTS 12 % LESS PER FOOT	HOLDS UNDER 800 LBS. PULL	NO "SPIDER" TO INJURE HANDS
Compared with			
USUAL 5/8" x .017 BALE TIE	COSTS 12 % MORE PER FOOT	BREAKS UNDER 500 LBS. PULL	DANGEROUS "SPIDER" OFTEN PRESENT

CEMENT COATED
CLOUT
BASKET
HOOP FASTENERS
TACKS

NAILS

KEG LOTS
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CARGOES
QUALITY GUARANTEED

J. R. REGNAS & CO., Atlanta, Ga.

TEXTILE SCALES

No. 5005. Gives yards per pound
No. 5000. Gives ounces per running yard
No. 5010. Gives yarn number for cotton yarns
No. 5015. Gives yarn number for woolen yarns
Used by U. S. War and Navy Depts.
CHRISTIAN BECKER'S ANALYTICAL AND SILK BALANCES
THE TORSION BALANCE CO.
Main Office, 92 Reade Street, New York
FACTORY: Jersey City, N. J.
BRANCHES: 31 W. Lake St., Chicago. 49 California St., San Francisco.

THE JOHNSON FRICTION CLUTCH

Single Clutch Exterior.

A light powered clutch of correct design and superior quality, for use with standard pulleys wherever a flexible power control is required.

Made in both single and double types, extremely simple, compact and durable in construction. Adaptable to all speeds and conditions.

The Johnson Clutch has been widely adopted for line-shaft drives in textile plants, and has been successfully incorporated into textile machinery of all kinds.

Write for our Catalog "G."

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

"Fun-Ful"
Improvements
All the Time

"Fun-Ful" Ocean Wave No. 201

Note the new and exclusive features in the Ocean Wave, insuring increased safety, pleasure and durability.

JUST THE THING FOR THE KIDDIES.

We Have

"Everything for the Playground"

Send for new catalog No. 5.

HILL-STANDARD CO.

SALES OFFICE
CONWAY BUILDING
CHICAGO, ILL.

FACTORIES:
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Edward Ferger, Southern Representative,
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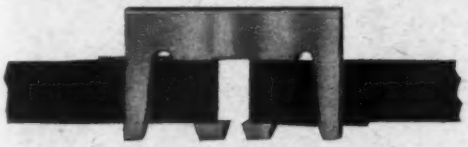

Acme No. 9 Bale Buckle

USE

ACME

Cold Rolled Bale Ties

with

Acme Bale Buckles

or

Acme Seals

Acme Steel Goods Co., Mfrs.

Atlanta: 10 Tift St.
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Acme Nailless Strapping with Seal applied

Wright
GOODS-PRICES-SERVICE

Fifty-Fifty

Employes and Employers are benefited equally when a Cafeteria or Lunch Room is installed.

EMPLOYES who eat well cooked, hot noon lunches, served in the mill's own spotless dining room, will show the results in increased physical and mental efficiency and contentment. Higher production will be easy for alert, satisfied employes.

LUNCH ROOM

Many mills and factories of all descriptions have seen their production records go up after investing in cafeteria and lunch room equipment for their employes.

Mail us copy of Blue Print of your Building and we will furnish you without obligation on your part, a practical blue-print layout for kitchen and cafeteria or lunch room to be located wherever you say.

We have in stock for immediate shipment the largest and most complete line of Kitchen, Cafeteria and Lunch Room Equipment ever carried in the South.

Write, Telephone or Wire for Our Representative.
One Near You Now.

THE WRIGHT CO., Inc.,

Importers and Jobbers

Hotel, Restaurant and Institution Equipment

185 Peachtree Street. ATLANTA, GA.

Wright Goods Wright Price Wright Service

Keep the Employes You Have

GIVE THEM THE CONVENIENCES THEY WANT

HERE is one way to hold employees, and make them more contented and healthy also.

They appreciate every little piece of equipment you install for their convenience, and it's certainly not an expense, but a good investment, to install this

MEECO Metal Equipment For Shop And Factory

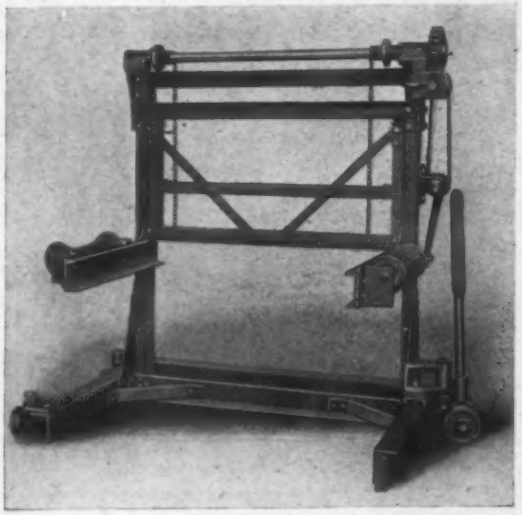
SANITARY EQUIPMENT

The line includes Sanitary Ice Cooled Drinking Fountains in many styles, Sanitary Wash Bowls in Batteries, Metal Clothes Lockers, Sanitary Toilets, and many other employee-keeping fixtures.

Write today for the complete catalog, and start today to solve your labor problem.

Manufacturing Equipment & Engineering Company

136 Federal St. Boston, Mass.
Address all communications to
FRAMINGHAM, MASS.



One Man Handles All Beams

Our portable elevators have many applications and serve many purposes around the mill. The design shown above is saving time and labor for mills, as with it one man can handle the heavy warp beams, move them about from place to place and set them in position on the loom.

Without obligation, one of our representatives will gladly call on you and tell you frankly what our equipment can do for you.

REPRESENTATIVES FOR
Economy Engineering Co., Tiering Machines.
Automatic Transportation Co., Storage Battery Trucks.
Barrett-Cravens Co., Lifting Platform Trucks.
Standard Conveyor Co., Conveying Systems.
Berger Mfg. Co., Steel Lockers and Bins.
"SERVING SOUTHERN CONCERNS"

J. D. COLLINS Ninth Floor Grant Bldg. **ATLANTA, GA.**

"THE STANDARD" AUTOMATIC DIAL SCALE

Doesn't Waste A Minute

"The Standard" Dial Scale brings the weighing of heavy loads down to a science—makes it a matter of seconds to obtain the accurate weight.

The scale sets flush with the floor, permitting trucks to be rolled on and off without reloading; tare beam allows for truck.

All that the operator has to do is glance at the dial—the weight registers automatically; figures are bold and clear with lots of spacing in between.

The entire scale is constructed of metal. It will handle loads anywhere from 2 pounds to 10,000 pounds.

New catalog tells all about our complete line—a scale for every need.

The Standard Scale & Supply Co.

1631 Liberty Ave., Pittsburgh, Pa.
NEW YORK
PHILADELPHIA
CHICAGO
CLEVELAND
BALTIMORE
DALLAS

Wooden Packing Cases

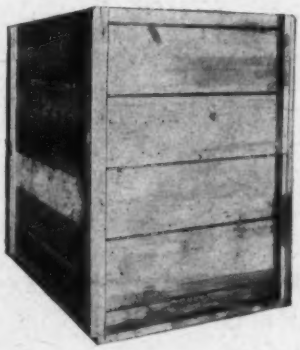
All Styles

Manufactured from
Georgia Pine
White Pine
Poplar
Cypress
and Gum

The interlocking packing case, shown in the upper left-hand corner, has advantages over other packages, especially for carrying heavy materials. In the first place lighter weight material can be used in its construction on account of the interlocking reinforcement. It is harder to pilfer or break open than other packing cases.

We are now in position to give all orders for shooks prompt attention, and will be glad to quote prices and delivery dates on any cases you might require.

In addition to rectangular tanks, we manufacture a complete line of round tanks equipped with round iron hoops and malleable draw lugs.



All our tanks are manufactured from heart cypress tank stock and we guarantee them to hold water.

Your inquiry solicited.

Hightower Box & Tank Co.

Corner Humphreys and Glenn Streets

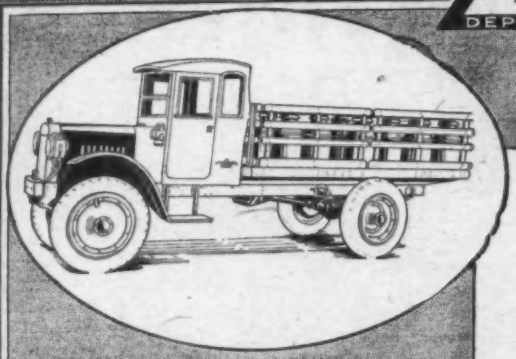
Box 1025 **Atlanta, Ga.**

TRI-ANGLE

POWER SERVICE MOTOR TRUCK DEPENDABILITY

A Three-Fold Value

¾ · 1½ · 2 Special & 2½ Ton Models



The Milk Special

The 2-ton Special TRIANGLE Truck, herewith illustrated, is particularly adapted to handle large shifting loads such as milk, oil or water.

These liquids present special haulage problems, and the TRIANGLE 2-ton Special meets these requirements exactly. The **side swing** or **slop** of the load is offset by the great reserve power of the driving member.

In other words the TRIANGLE 2-tonner is equipped to give the same long, dependable service with **shifting** loads as our other types supply with package and other burdens.

One fleet sale would be well worth while. Your territory may still be open. Our literature on request.

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Eastern Representatives
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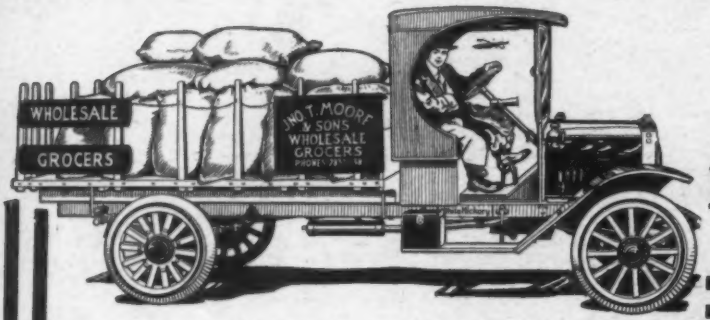
381 Fourth Ave. New York City

New England Distributors
Eugene F. Lally and Sons Co.
Boston, Mass.

TRIANGLE MOTOR TRUCK COMPANY
St. Johns, Michigan



White Hickory

BUILT ON HONOR.

Motor Trucks

"THE UTMOST IN SERVICE"

These units assure dogged endurance.

Continental Red Seal Motor, Eisemann High Tension Magneto, Sheldon or Timken Worm Drive Axles, Timken Bearings and all other units of highest standard grade.

Power - - Endurance - - Flexibility - - Rugged overstrength of all parts that carry hardest strains, make the White Hickory Truck adaptable for your hauling requirements.

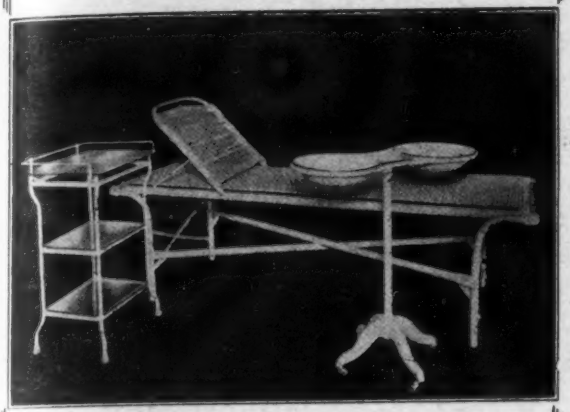
White Hickory Motor Trucks are built in Atlanta, thus giving users Factory Service of the highest type, available within 24 hours.

Let the forty year record of the White Hickory Wagon be your assurance of the steadfast dependability of The White Hickory Truck.
We will gladly help you select the right Truck for your business.

White Hickory Motor Corporation

ATLANTA, GEORGIA

F. H. Thomas Co.
Boston, Mass.



A First Aid Room or an Emergency Hospital For Your Employers will

Decrease your liability for industrial accidents.

Decrease time lost through temporary incapacity of your workers.

Decrease needless suffering from minor injuries and prevent minor injuries from developing into serious cases.

Increase morale and loyalty among your employees and give you opportunity to show your interest in the welfare of your workers.

The F. H. Thomas Company has equipped First Aid Rooms for over four hundred factories and mills, who have appreciated these facts, including the following Southern mills:

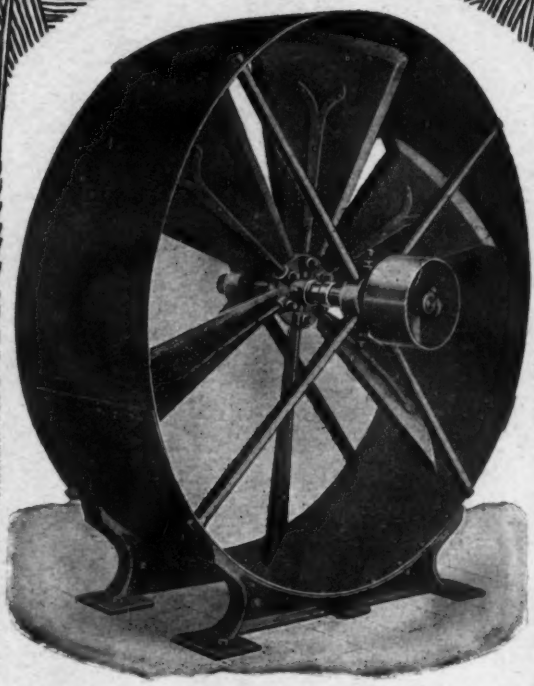
WINSBORO MILLS Winsboro, S. C. **WATEREE MILLS** Camden, S. C. **WHITNEY MILLS** Whitney, S. C.

A modern Thomas equipped emergency room will put you also among the progressive owners who are saving money and advancing the conditions of their workers.

Write for information and advice, stating, if possible, the number and nature of your accidents. Southern Representative.

F. H. Thomas Co.
689-691 Boylston St.
Boston. Mass.

BETTER Ventilation FOR TEXTILE MILLS



Perkins Fans

will best solve the cooling and ventilation problem in your mill and can be placed almost anywhere, because of their light weight, steel frame construction.

They are noiseless, and because of end thrust ball bearing collars, self oiling journal boxes, they require no attention and always run smoothly, and without vibration.

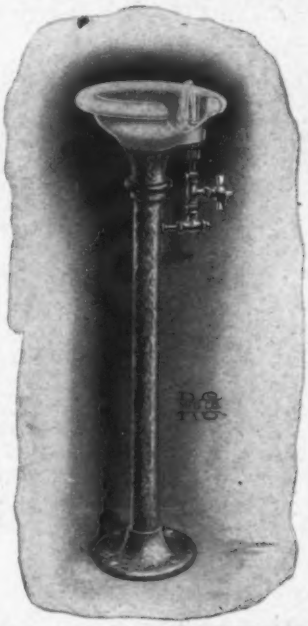
Less power is required for their operation.

Write today for bulletin.

B. F. Perkins & Son, Inc.
Holyoke, Mass.

USE

R–S PRODUCTS



In choosing a fountain, whether for a public utility, or private enterprise the buyer should buy the fountain that has been proven so by actual tests in a scientific way.

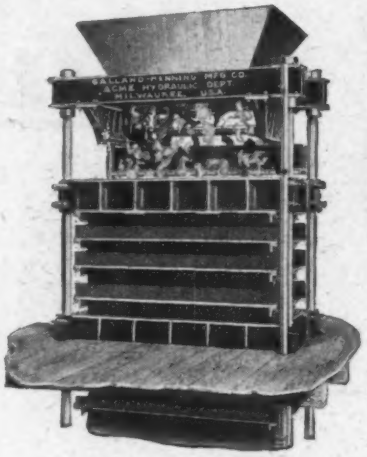
"VERTICO-SLANT" STREAM FOUNTAINS IN ACCORD WITH SCIENCE

Industry demands the most modern equipment in supplying the needs of the world and provides safeguards about its machinery to protect its workers. Why not modernize in every particular by utilization of drinking fountains that have been made safe?

A refreshing drink of water means renewed energy to the man on the job and water that is as nearly germ-free as a fountain can keep it should be provided.

We will be glad to supply you with full details in regard to sanitary equipment. Write us today for copy of our new catalog "C."

RUNDLE-SPENCE MFG. COMPANY
MILWAUKEE, WIS.



Acme Doorless Baler

Patents Pending

MOST IMPORTANT INVENTION

Ever Perfected in Baling Presses

Less Labor—More Rapid—Greater Power
Less Floor Space
Built in numerous sizes and pressure capacities.

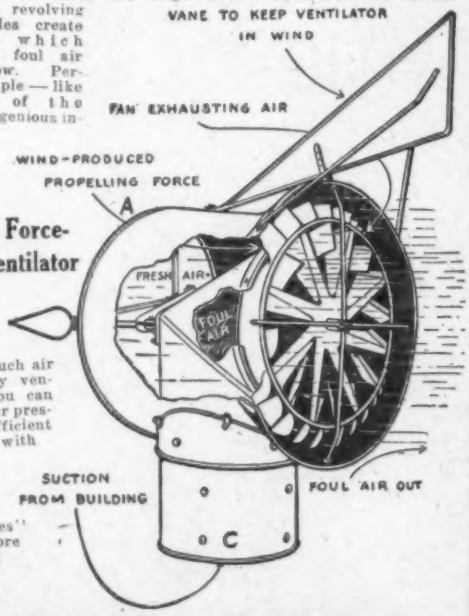
Write for details.

Galland-Henning Mfg. Co.
Milwaukee, Wis.

Southern Sales Representatives
THE LOVINGOOD COMPANY
Atlanta, Ga.

The Wind-Mill Principle Applied to a Ventilator

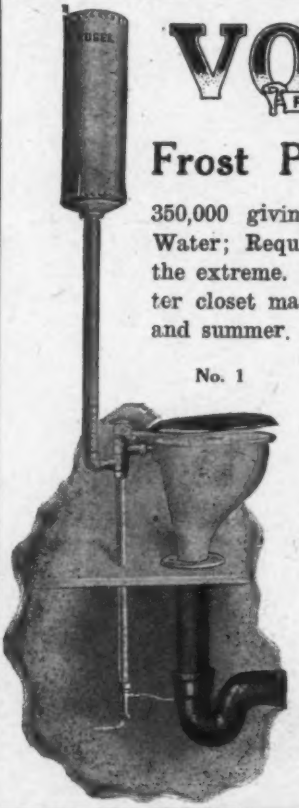
Note the illustration! The fresh air passing over the funnel comes in contact with the small outer blades, thereby propelling the wheel to which the large inner blades are also attached. These revolving inner blades create a vacuum which sucks the foul air from below. Perfectly simple — like so many of the world's ingenious inventions. The



Carlisle Force-Draft Ventilator

displaces from 5 to 6 times as much air as ordinary ventilators. You can replace your present inefficient Ventilators with fewer and smaller sized "Carlisles" and get more ventilation! Write for descriptive folders.

CARLISLE & GALE CO.
5 NORTH STREET CAMBRIDGE, MASS.



VOGEL
PATENTED

Frost Proof Closets

350,000 giving satisfaction. Save Water; Require no Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.

No. 1

- Enameled roll flushing rim bowls.
- Heavy brass valves.
- Strong hardwood seat. Galvanized tank.
- Malleable seat castings will not break.
- Tested under hydraulic pressure before leaving factory.

ASK YOUR JOBBER

JOSEPH A. VOGEL CO.
WILMINGTON
DELAWARE

Kaustine

Sanitary Sewage Disposal Systems

Better Morale in *Your* Mill Village

THE better class of workmen ***seek*** the ordinary conveniences and comforts of home life, which you ***demand*** for yourself. They know that their productive power and earning capacity are dependent upon their physical condition as well as upon their mental state.

Kaustine Sanitary Equipment installed in mill homes provides the comfort and refinement essential to healthy, contented inhabitants of unsewered mill villages.

It is complete and scientific in every respect—endorsed by health boards everywhere, because of the thorough and adequate manner in which it disposes of fecal matter immediately after discharge from the body. It affords the convenience of a city water toilet.

To insure an ample supply of reliable labor, every mill village in an unsewered area should be equipped with a Kaustine Chemical System, or Hydro Kaustine Septic Tanks. It is welfare work that returns big dividends.

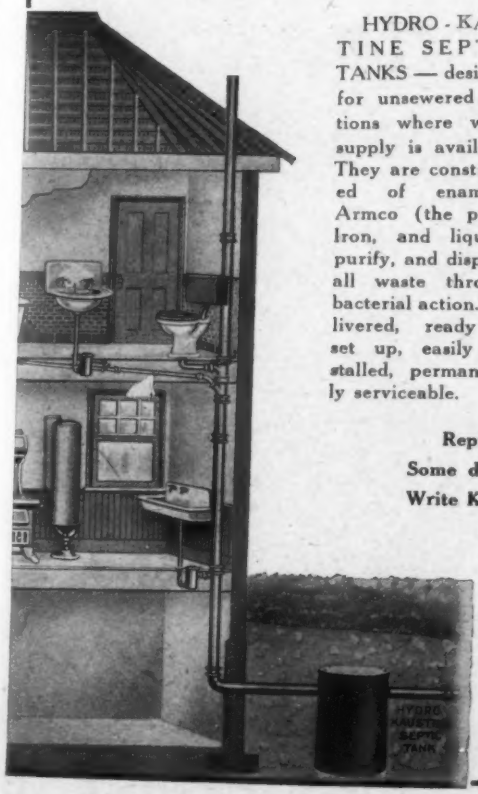
Send for our catalog H, which shows how Kaustine equipment solves the problem of sanitation in unsewered areas, and provides the convenience that keeps men healthy and satisfied.

KAUSTINE COMPANY, Inc.

Manufacturers and Sanitation Engineers

Buffalo, N. Y. Toronto, Can. Melbourne, Australia.

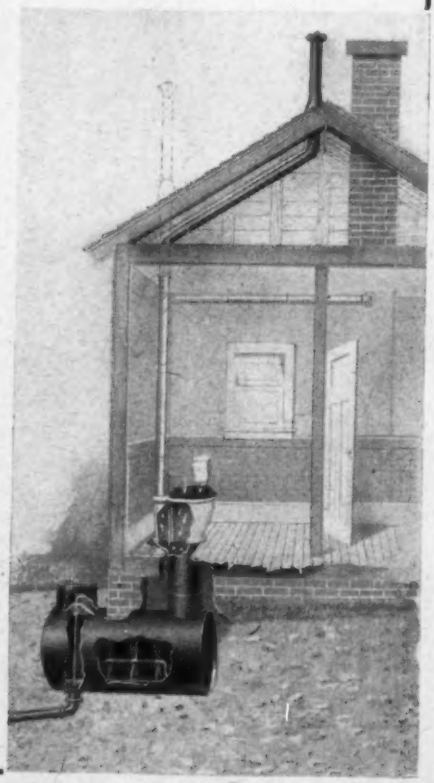
Southern Representatives
J. L. Murphy, Charlotte, N. C.
McKee & Son, Atlanta, Ga.



HYDRO-KAUSTINE SEPTIC TANKS — designed for unsewered sections where water supply is available. They are constructed of enameled Armco (the pure) Iron, and liquefy, purify, and disperse all waste through bacterial action. Delivered, ready to set up, easily installed, permanently serviceable.

KAUSTINE (CHEMICAL) TOILET SYSTEM—for unsewered sections WITHOUT WATER supply. Disposes of sewage thru chemical action which liquefies and purifies it. Perfect ventilation system makes it odorless. All metal parts constructed of enameled Armco (the pure) Iron. No pumping or dipping of tank contents — turning drain valve disposes of purified contents through leaching pool.

Representatives Wanted
Some desirable territory open.
Write Kaustine Company, Inc.,
Buffalo, N. Y.



Familiar Doors Equipped With Richards-Wilcox Door Hangers

If you passed through the U. S. Concentration Camp at Brest, France, during the great war, you may remember the long piers with enclosed warehouses, built by Uncle Sam's engineers, for loading and unloading troops, materials and supplies. One of these is shown in the picture.

U. S. Goverment Pier 7 and 8, Brest, France

This pier is 500 feet long. The doors on both sides of the warehouse along its full length operate on R-W No. 121 warehouse door hangers running in R-W No. 33 trolley track. The doorway openings are 8' wide. The door hanger material installed thereon is part of the thousands of door hangers furnished by Richards-Wilcox to help win the war, along with quantities of other Richards-Wilcox hardware equipment such as Door-Checks, Wagon Jacks, Grindstones, "OveR-Way" Conveying Equipment, and kindred hardware.

For particular information about Richards-Wilcox Door Hangers "OveR-Way" Conveying Equipment and other hardware write

Richards-Wilcox Mfg. Co.

A Hanger for any Door that Slides

CHICAGO ST. LOUIS LOS ANGELES PHILADELPHIA — AURORA, ILLINOIS, U.S.A. — BOSTON NEW YORK MINNEAPOLIS SAN FRANCISCO — LONDON, ONT.

COOLEDGE HYGRADE

C THE CH LINE H

"Best for the Southern Climate"

C-H Bungalow Shingle Stains

For Shingle roofs and weather-boarding

C-H Home Paints

For Exterior and Interior Use

C-H Perma White

Interior gloss mill paint

Let us Send Booklet and Color Card Also names of Mills and Mill Contractors that have used our paints

"IMMEDIATE SHIPMENTS"

Just write on your letter-head— "Send Your Catalog"

F. J. COOLEDGE AND SONS

ATLANTA GA. SAVANNAH

Manufacturers of paints, stains and varnishes
Jobbers of window and building glass, and wallboard

AGASCO ROOFING FELT

LASTS INDEFINITELY

—for the wide expanse of industrial roof that must be covered effectively but at moderate cost—Withstands the extremes of weather—Resists the elements.

We have it or will make it to suit almost any specification, if your order warrants that.

AGASCO ROOFING PITCH

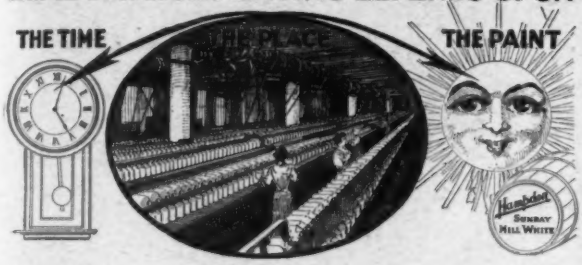
—prolongs the life of your old roof
—Made according to YOUR specification.

AGASCO PAINTS AND CREOSOTES

ATLANTA GAS LIGHT Co

ROOM 235, 20 FAIRLIE ST.

REAL DAYLIGHT SAVING DEPENDS UPON



DAYLIGHT may be saved by the clock but of what use is saved daylight unless it is spent wisely?

Money thrown away to waste floods of daylight every day in workrooms whose dingy walls are misers of daylight—absorbing all—giving nothing back.

Better to "Sun-surface" walls with Hampden *Sunray* Mill White Oil Paint and turn them into mirror-like refracting surfaces which shed the light onto machines and work benches—cheering workers—helping eyesight—boosting production.

Hampden *Sunray* Mill White Paint goes on without brush marks and forms a long lived, snow white glazed surface that withstands vibrations, resists dirt—and is washable.

Send for particulars of Hampden Sunray Mill White Users in the Textile Industry

Deliveries direct from the Factory or from Local Dealers

HAMPDEN PAINT & CHEMICAL CO.

Good Paint Makers for over 67 years

Div' ion E, Springfield Massachusetts

Hampden
SUNRAY
MILL WHITE

TO our clients and friends who visit Europe on business or pleasure, our Paris organization

Compagnie
Lockwood Greene
47, Avenue de l'Opéra
Paris, France

extends a cordial welcome.

Our office offers convenient headquarters with an American atmosphere to those studying the foreign situation.

Our Mr. W. L. Nicoll and his associates, Messrs. Smith and Walker will take pleasure in doing everything possible to make your visit enjoyable and profitable.

BUILDING WITH FORESIGHT

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BOSTON ATLANTA CHICAGO NEW YORK DETROIT
HARTFORD CLEVELAND CHARLOTTE PHILADELPHIA
LOCKWOOD, GREENE & CO. OF CANADA, LTD., MONTREAL
COMPAGNIE LOCKWOOD GREENE
47, Avenue de l'Opéra, PARIS, FRANCE

Creosoting Industrial Timbers Is ECONOMY

CARBO, FIRST GRADE REFINED CREOSOTE OIL

Meets all requirements of the United States Government Shipping Board Emergency Fleet Corporation, Specification G174-A-1 and the United States Railroad Administration, Specification R-828-A.

The cheapest sap wood timbers, especially sap wood pine shingles treated with this oil **will outlast the highest grade woods untreated.**

NUMBER ONE CRUDE CREOSOTE:

An economical wood preservative for open tank or brush treating wood shingle roofs, or structural timbers. This material when properly applied greatly lengthens the life of the cheaper timbers.

PURE CREOSOTE DISINFECTANTS COEFFICIETS ONE TO TWENTY.

Each shipment tested by Ridell-Walker method and guaranteed as to carbolic strength.

Our standard disinfectants are free from sediment and tarry matter and upon dilution with water form rich, cream-like emulsions (no oily float on top nor deposit at bottom). Emulsions do not separate on standing.

Our disinfectants are manufactured by the largest Manufacturer of coal-tar products in America and are absolutely uniform.

Gulf States Creosoting Company

17 Sampson Street, ATLANTA, GA.

THE HURST COMPANY

208 Austell Bldg.

Atlanta, Ga.

We Manufacture

Paints that are Specially Adapted to the South Country.

Best Roof Paint,
Best Rubber Roofing Paint, and
Best Bridge and Metal Paints.

SATISFACTION GUARANTEED.

Also Rubber and Slate Surfaced Roofing.

Make your inquiries to us.

Prices Cheerfully Quoted.

CRESSON-MORRIS CO.

POWER TRANSMITTING MACHINERY

Merit Plus Recognition

"The heights by great men reached and kept were not attained by sudden flight."

Time, skill and effort must also proceed merit as surely in machinery as in men.

Time, skill and effort must also proceed merit in order to obtain and maintain for merit the recognition it deserves.

The great number of large installations of Cresson-Morris Power Transmitting Machinery is proof of both the merit and the recognition of the merit that nearly three score years of skill and effort have endowed it with.

The cumulative knowledge of all this experience is always available to you in the recommendations of our engineers.

CRESSON-MORRIS COMPANY

ENGINEERS—FOUNDERS—MACHINISTS

PHILADELPHIA, PENNA.

Branch Office 141 Milk St., Boston, Mass. 20

Stanley Belting

is preferred, because of its efficient service, in woolen and knitting mills, in dye houses, bleacheries and finishing plants, where it is used extensively in spite of detrimental atmospheric conditions.

It is solid woven—there are no plies or laps to come apart.

STANLEY BELTING CORPORATION
36 S. Clinton St., Chicago, Ill.

One of many Connecticut Factories Equipped with Jewell

Jewell Belting

1770—1920

IN these days of large-scale production, men in charge of modern plants are giving their best thought to the standardization of both the product itself and the methods of manufacture. Power transmission in all its phases becomes more than ever a vital factor in their calculations.

It is but natural that they should find the satisfactory solution for this part of their problem in the installation of Jewell belting—belting which has rendered truly efficient service ever since machine power has driven wheel in America.

Jewell Belting Company
Hartford Conn.
Western Branch: 2837 So. LaSalle St., Chicago

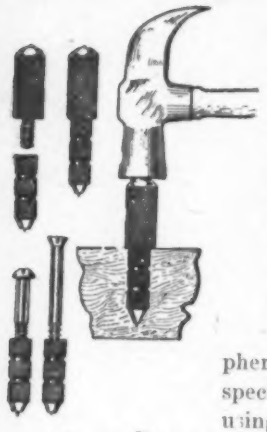
CRESCENT BELT FASTENERS MAKE GOOD BELTS GIVE BETTER SERVICE

THEY DO- AND MORE.

Write to DEPT. 58

CRESCENT BELT FASTENER CO.
381 FOURTH AVE., NEW YORK
-or ask your local dealer

The Only Screw Holes



IN THE WORLD

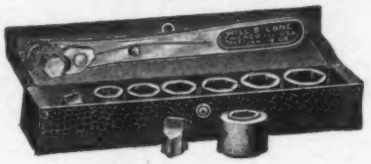
The "Hole" Problem

The advantages of Screw Holes are: they can be used without damage to receiving material; they enable you to Standardize to wood or machine screws in all materials; they are made of brass and will not rust under atmospheric or moisture conditions; special tools are not needed for using them in any material; they can be used in any place a screw con be used; no can be used in any place a screw can be used; no any wood screw or machine screw now in stock; they make the neatest possible job in any material; they are endorsed by all dealers in screws, and by all users of screws; in spite of the high cost of brass, Screw Holes are yet cheap; they make everlasting holes in any material, and anyone who can drive a nail can use them.

The Stine Screw Holes Company

Waterbury, Conn. U. S. A.

Lane's UNIQUE Ratchet Tools



STANDARD SET
Consists of Ten Pieces

1—7-inch Ratchet Wrench (Drop-Forged)
2—Screw Driver Bits
7—Sockets—turned from solid round bar (Machinery Steel)—broached hexagon openings—fitting U. S. Standard Cap Screws 5-16 inch to 5-8 inch (except 9-16 inch) and Hexagon Nuts—1-4 inch to 1-2 inch (except 7-16 inch). S.A.E. Cap Screws and Hexagon Nuts 5-16 inch to 9-16 inch

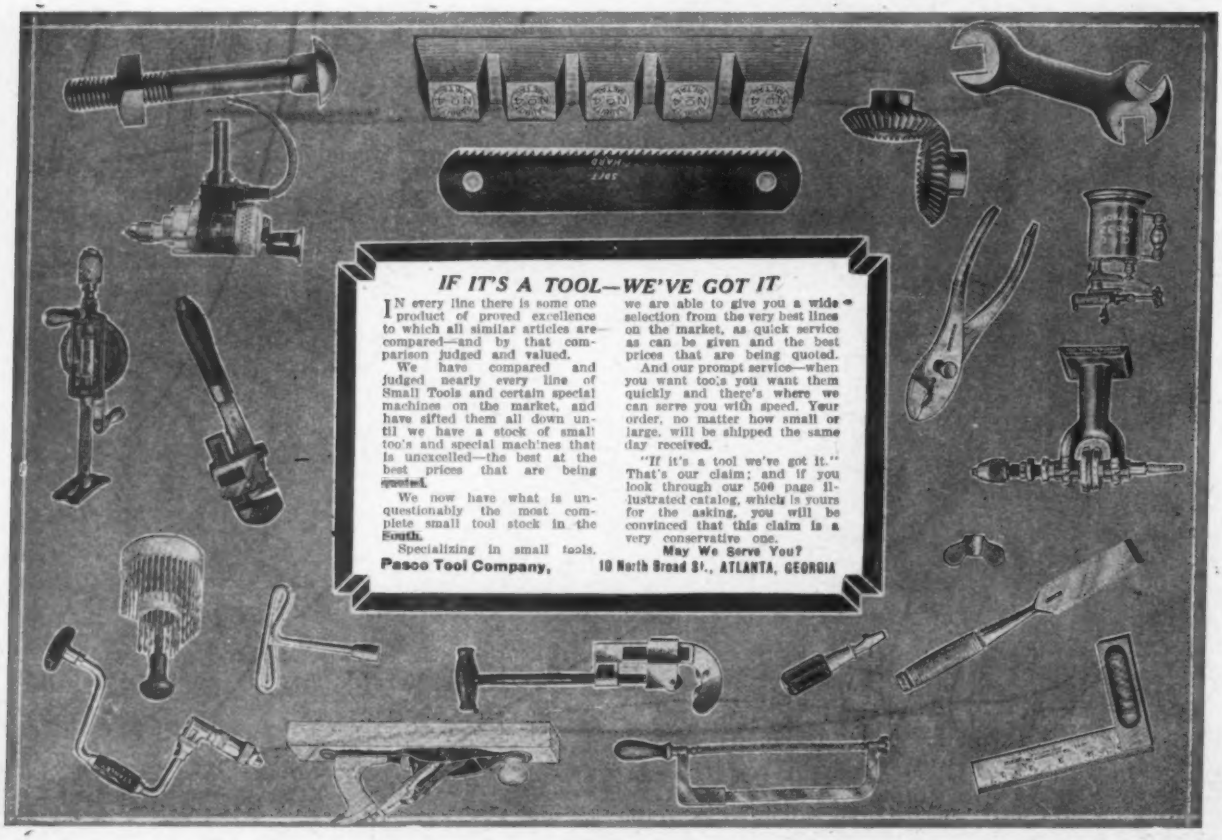
Size of Socket Openings

1-2 inch fits { 1-4 inch Hexagon Nut / 5-16 inch Cap Screw
9-16 inch fits 3-8 inch Cap Screw
39-64 inch fits 5-16 inch Hexagon Nut
5-8 inch fits 7-16 inch Cap Screw
11-16 inch fits 3-8 inch Hexagon Nut
3-4 inch fits 1-2 inch Cap Screw
7-8 inch fits { 1-2 inch Hexagon Nut / 9-16 inch Cap Screw S.A.E. / 5-8 inch Cap Screw U. S.

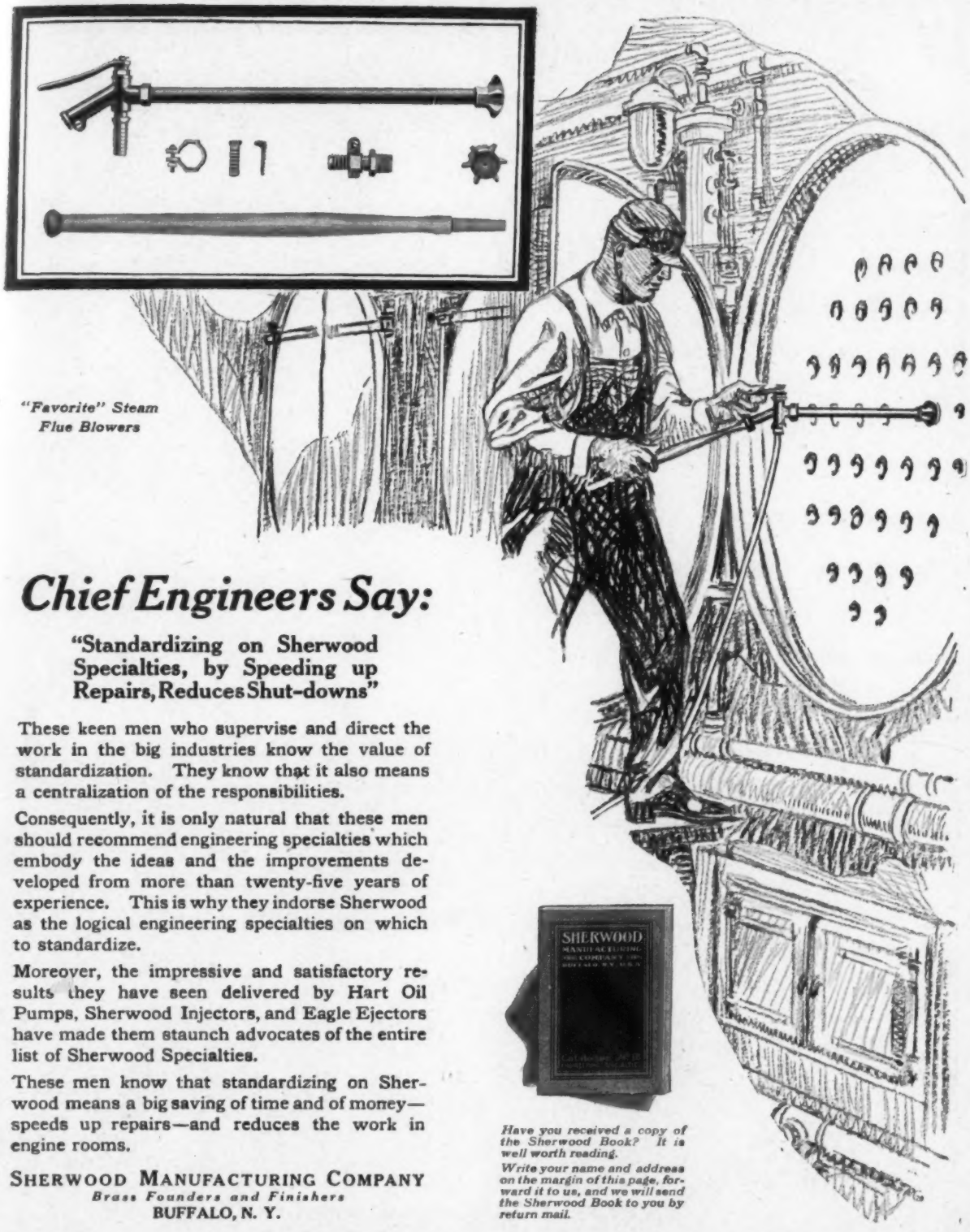
Packed in strong Black Fibreroid Case
Weight 22 ounces

LIST PRICE, $3.50

WILL B. LANE UNIQUE TOOL CO.,
180 N. Dearborn St., Chicago, Ill.


IF IT'S A TOOL—WE'VE GOT IT
IN every line there is some one product of proved excellence to which all similar articles are compared—and by that comparison judged and valued.
We have compared and judged nearly every line of Small Tools and certain special machines on the market, and have sifted them all down until we have a stock of small tools and special machines that is unexcelled—the best at the best prices that are being quoted.
We now have what is unquestionably the most complete small tool stock in the South.
Specializing in small tools, we are able to give you a wide selection from the very best lines on the market, as quick service as can be given and the best prices that are being quoted.
And our prompt service—when you want tools you want them quickly and there's where we can serve you with speed. Your order, no matter how small or large, will be shipped the same day received.
"If it's a tool we've got it." That's our claim; and if you look through our 500 page illustrated catalog, which is yours for the asking, you will be convinced that this claim is a very conservative one.
May We Serve You?
Pasco Tool Company, 10 North Broad St., ATLANTA, GEORGIA

"Favorite" Steam Flue Blowers



Chief Engineers Say:

"Standardizing on Sherwood Specialties, by Speeding up Repairs, Reduces Shut-downs"

These keen men who supervise and direct the work in the big industries know the value of standardization. They know that it also means a centralization of the responsibilities.

Consequently, it is only natural that these men should recommend engineering specialties which embody the ideas and the improvements developed from more than twenty-five years of experience. This is why they indorse Sherwood as the logical engineering specialties on which to standardize.

Moreover, the impressive and satisfactory results they have seen delivered by Hart Oil Pumps, Sherwood Injectors, and Eagle Ejectors have made them staunch advocates of the entire list of Sherwood Specialties.

These men know that standardizing on Sherwood means a big saving of time and of money—speeds up repairs—and reduces the work in engine rooms.

SHERWOOD MANUFACTURING COMPANY
Brass Founders and Finishers
BUFFALO, N. Y.

Have you received a copy of the Sherwood Book? It is well worth reading.

Write your name and address on the margin of this page, forward it to us, and we will send the Sherwood Book to you by return mail.

SHERWOOD
ENGINEERING-SPECIALTIES

FULTON SUPPLY CO.
ATLANTA GEORGIA
MILL SUPPLIES
MACHINERY

When You Buy Machinery—Plus

There is something more than mere machinery sales in the transactions that occur between this house and its customers. For while we pride ourselves on the fact that we are prepared to supply your every machinery need, whether it be for the largest engine or the most delicate tool, we take a still greater pride in the fact that **our most important item of merchandise is service.**

You can buy machinery almost anywhere. In buying from us, however, you buy, without additional cost, machinery **plus the service** which our staff of mechanical engineers is prepared to give you, in suggesting solutions of your problems.

Fulton Supply Co.
ATLANTA
GEORGIA

We will welcome an invitation to confer with you and tell you about the service we are equipped to give you.

"Cotton Mill Machinery Calculations"

EVERY Textile Man should have these reference books. They cover in a detailed and thorough manner all calculations necessary to be made on any cotton mill machinery manufactured in the United States and constitute one of the best references on the subject obtainable.

The two volumes are illustrated with 45 diagrams and contain 21 reference tables.

As the value of a book lies in its contents and not in a fancy cover, we have put these two volumes out in a strong, serviceable paper binding. You can secure them in conjunction with a subscription to COTTON.

Write for circulars and full information.

Tycos
TEMPERATURE
INSTRUMENTS
Indicating
Recording
Controlling
Link Science with Industry
IN every industrial activity of modern times mankind is dependent on the proper uses of heat.
Tycos Indicating, Recording and Controlling Temperature Instruments have removed the element of guesswork from all heating and cooking problems.
They have been the decisive factor in making possible quantity production.
In solving thousands of special temperature problems we have probably solved your difficulties—a letter will prove it.
Taylor Instrument Companies
ROCHESTER N.Y.
There's a Tycos or Taylor Thermometer for Every Purpose
CC9

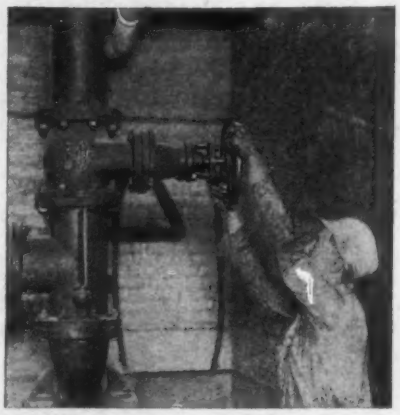
Jenkins Standard Iron Body Gate Valves

DOUBLE face solid wedge type. The improved shape of the body and bonnet not only insures perfect castings free from internal shrinkage strains, but secures the maximum of strength and rigidity and enables the valves to resist without distortion and leakage the severe stresses to which they will inevitably be subjected.

Bodies and bonnets of high-grade cast iron. Seat rings are bronze and the gates or wedges cast iron faced with bronze rings firmly secured to wedge, except in smaller sizes, in which the wedges are made entirely of bronze. Inside screw valves have bronze spindles—outside screw steel spindles, but bronze spindles can be furnished if desired.

All valves, either stationary or rising spindle, can be packed under pressure when wide open.

Jenkins Valves are made in types and sizes to meet all requirements—the genuine are known by the Jenkins "Diamond Mark." Your supply man can serve you.



Illustrated is Fig. 326. Jenkins Standard Iron Body Gate Valve, flanged inside screw, stationary spindle, installed on thick syrup line in Wrigley's gum factory, Chicago.

JENKINS BROS.

New York	Washington	Chicago	St. Louis
Boston	Philadelphia	San Francisco	Pittsburgh
	Montreal	London	Havana

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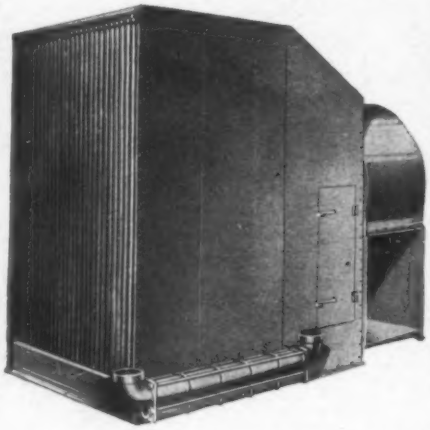


Seri-Vane Fans

Cut shows a compact heating unit as regularly installed by us for large Factory and Industrial Heating and Ventilating units. The large range of adaptability for our fans, heaters, air washers, etc., is clearly brought out in catalog No. 70.

We have lately prepared a special treatise devoted to paper drying and kindred products which we think will prove of value to those manufacturers who desire to increase their production and the quality at the same time. Ask for Bulletin No. 11.

If we cannot truthfully show you where a SERI-VANE FAN can do your work better and save you money at the same time, we say so frankly. We do not try to force a sale but gladly make any suggestions or recommendations which our experience knows to be practical and feasible, and then allow the customer to decide freely from the facts presented. There is positively no string attached to our engineering advice.

HAVE YOU A FAN PROBLEM? IF SO, WRITE

The New York Blower Company

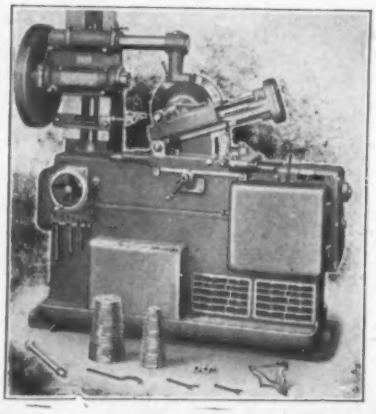
608 S. Dearborn Street **CHICAGO, ILLINOIS**

Branch Offices in Principal Cities

Machine Tools, General Mill and Machinery Supplies

THE WALRAVEN COMPANY

36-38 West Alabama Street Atlanta, Georgia



SINCE 1855 Brown & Sharpe have built Gear Cutting Machines. You will find them giving satisfactory service everywhere.
Whether it is for spur or bevel gears, large gears or small gears, there is a time-tried B & S Gear Cutting Machine to fill your need.
Brown & Sharpe machines are built up from foundry to inspection room with accuracy—accuracy for long service—the keynote of every operation.

Exclusive Southern Representatives for

BROWN & SHARPE
Milling Machines, Gear Cutting Machines, Grinders, Screw Machines, Etc.

HENDEY
Lathes, Shapers, Centering Machines

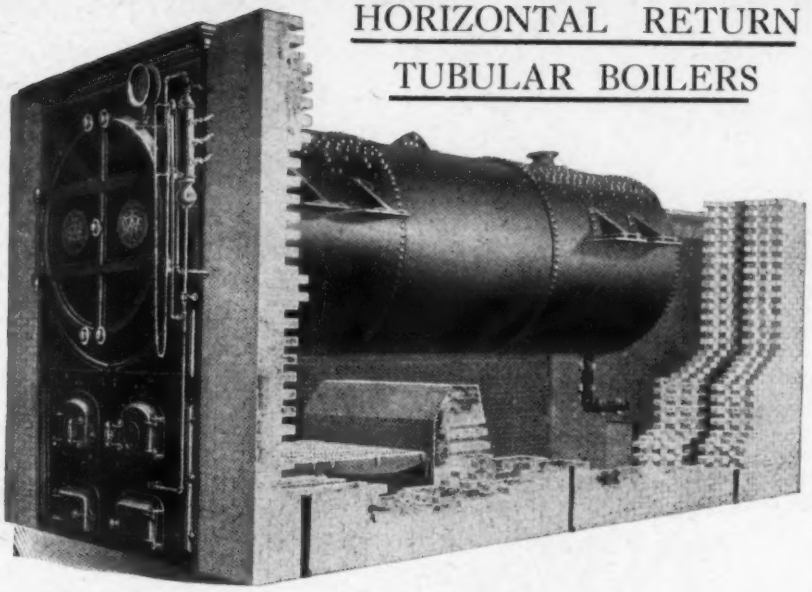
BULLARD
Boring and Turning Mills, Vertical Turret Lathes

DRESES
Radial Drills

GRAY
Planers

Let us quote you on your requirements
Our service is unexcelled

HORIZONTAL RETURN TUBULAR BOILERS



The Highest Development in a Safe Economical Return Tubular Boiler

The horizontal return tubular boiler has adapted itself so fully to the requirements of the rapidly increasing industries of this country that it has become the standard and most preferred type for factory and mill use.

There were some dissatisfactory features of older makes of this type of boiler, but in designing our make we have endeavored to embody only the most perfect features of other boilers and eliminate all the objectionable features.

The result is a PERFECT Return Tubular Boiler that as to safety is fully in accordance with the very strict requirements of the Massachusetts Board of Boiler Rules and ASME Code, and as to economy in operation and low up-keep cost is not surpassed by any other boiler on the market.

Being very simple in design, it has a lower first cost, it takes less fuel to make it steam to full and overload capacity, requires less repairs, and when repairs do become necessary they can be made more easily and at less expense than in other makes of boilers.

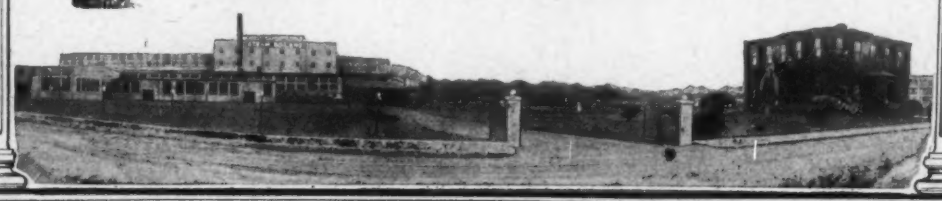
Every boiler that leaves our shops is thoroughly tested and under our rigid inspection you are assured of getting a perfect unit, mechanically as well as in design.

Write today for full information.

INTERNATIONAL ENGINEERING WORKS, Inc.
FRAMINGHAM, MASS.

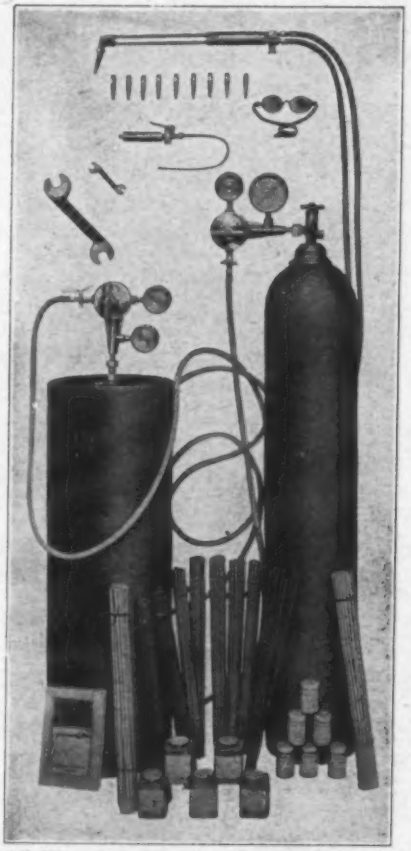
Southern Representative: Isaac Hardeman, Charlotte, N. C.

Boston New York Philadelphia Charlotte San Francisco



WATERHOUSE

Oxy-Acetylene Cutting and Welding Outfits



All Waterhouse products are built on the idea that the very best workmanship and material make a product which in the end is the cheapest.

NO TEXTILE MILL can afford to be without a WATERHOUSE Welding Equipment. It often pays for itself on a single job. Having a WATERHOUSE Welder is like having a complete stock of new parts, for any broken part may be made as good as new in a short time. No delay while new parts are coming from the factory; no money tied up in spare parts. It is making and saving in many mills; put it to making and saving for you.

Waterhouse Welding Company

BOSTON, MASS.

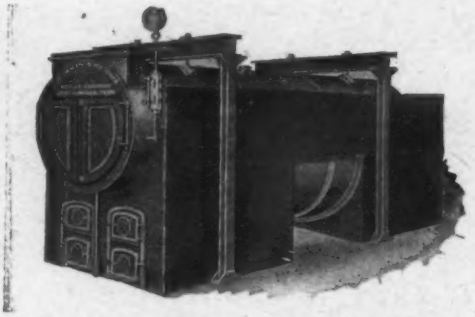
Complete catalogue on request.

WALSH & WEIDNER BOILERS

Set in Our Improved Steel Casings

SAVE 10% TO 25%

Of Your Fuel Bill.



Send for Descriptive Bulletin.

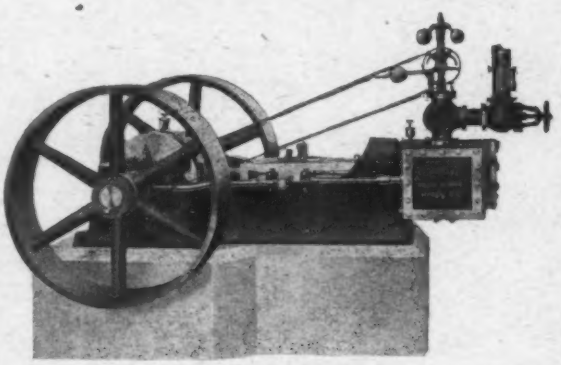
BOILERS---TANKS

Structural Steel Work

Boiler Tubes, Castings, Etc.

The Walsh & Weidner Boiler Co.

CHATTANOOGA, TENN.



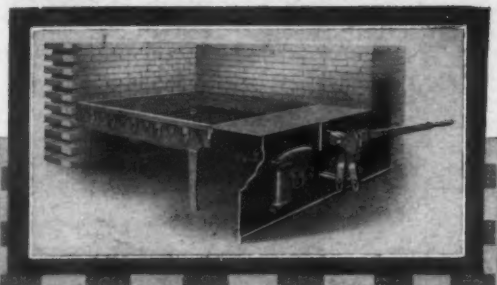
J. S. Schofield's Sons Co.

Macon, Georgia

MANUFACTURERS OF

High Pressure Return Tubular Boilers, High Grade Stationary Steam Engines, Tanks, Stacks, Stand Pipes.

Heavy Castings and Wrought Iron Works.



AJAX GRATES

15% LESS COAL

Means many dollars saved every day of the year – and the AJAX will do better than this in most cases.
Our claims are based on results given in actual service over a long period of years-

Ajax will save coal- -Save labor- -Cut upkeep- and increase steam.

Our Booklet "The Economical Burning of Coal" will be mailed, without obligation, on request.

VALLEY IRON WORKS
WILLIAMSPORT, PA.
ESTABLISHED 1865

"VALLEIRON"
V

Save 20% On Coal

By taking out all condensation as it forms in steam lines, coils, vacuum pans, clarifiers, evaporators, etc., and returning it to boilers as hot feed water, the Morehead Back-to-Boiler System reduces fuel consumption 20 to 50 pe cent.

It makes the condensation in steam lines pay a profit.

Automatically the Morehead Back-to-Boiler System picks up every bit of the condensation—keeps it from clogging steam lines—and rushes it right back to the boilers while it is hot.

The Morehead System saves coal because you have an abundance of pure hot distilled water for use as boiler feed—and you get vitally improved results from your steam heated equipment because the entire heating surface is always free for active work.

Let us send you our catalog.

Morehead Manufacturing Co.

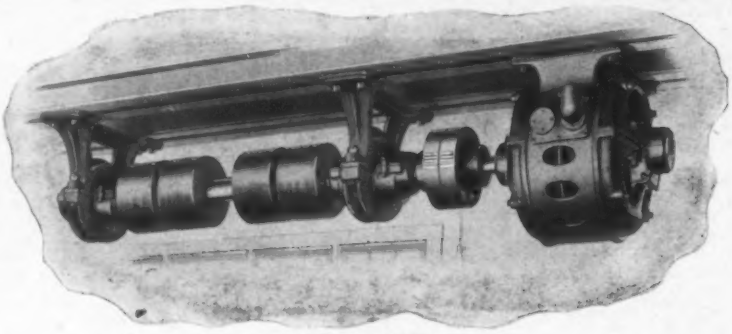
Detroit, Michigan

Morehead Manufacturing Company, Woodstock, Ont.
For Dominion of Canada.

Positively Drains All Types of Steam Apparatus — Delivers Condensation And Feed Water to Boiler Under All Conditions at Maximum Temperature — Your Feed Bills are Less

Morehead

"BACK-TO-BOILER-SYSTEM"



OLD MILL DRIVE

Four-Frame Drive for Old Mills

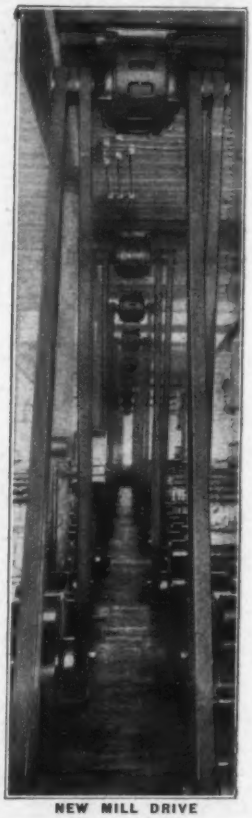
All pulleys are on one end and can be adjusted to suit any spacing between frames. This makes it unnecessary to move the frames.

For New Mills Pulleys are on both ends of Motor as spacing between frames can be adjusted.

Motors for all Textile Drives

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.



NEW MILL DRIVE

Brazing—Oxy-Acetylene and Thermit

WELDING

Over ten years of practical experience in brazing and welding all kinds of machinery and equipment enables us to offer efficient service to the cotton and knitting mills.

Parts shipped to us welded and returned promptly.

Or wire us, and one of our first-class machinists and practical welders will come to your plant and weld your job for you.

Boiler Welding A Specialty

CHATTANOOGA BRAZING & WELDING CO.

1309 Chestnut St., Chattanooga, Tenn.

MACHINE TOOLS

Lathes, Drill Presses
Shapers, Planers
Electric Motors
Automatic Gear Cutters
Etc.

Everything for the Up-to-Date Machine Shop.

"Economy is buying wisely, not cheaply"

SEEGER MACHINE TOOL CO.
34 S. Forsyth St. Atlanta, Ga.

APPROVED
ELECTRICAL FITTINGS

APRIL, 1920

Official Approval

Factory Mutual's Laboratories

Cartridge Type, Magazine Style.
Greeff Engineering & Mfg. Co., Newark, N. J., Multiple Electric Products Co., Inc., New York, N. Y., Sole Agents. "Atlas," 4 in 1 non-indicating. (0-100A., 250 and 600V.)
This manufacturer is prepared to refill Atlas fuses in all sizes including the ferrule type.

INSPECTION DEPARTMENT
Associated Factory
Mutual Fire Insurance Companies,
31 Milk Street, Boston, Mass.

Facsimile of the official listing, April, 1920

In addition to above, fuse is now approved 110 to 200 amp., 250 volts.

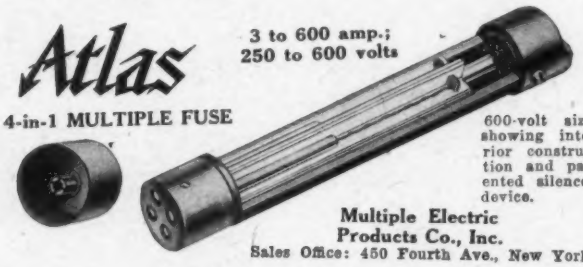
A fuse that is not merely sold to you, but maintained in service thereafter, at the lowest cost of any fuse so approved.

Send for samples, prices and comparative statement showing costs of all makes based on authentic laboratory tests. Give name of your electrical dealer or distributor.

Atlas

4-in-1 MULTIPLE FUSE

3 to 600 amp.; 250 to 600 volts



600-volt size, showing interior construction and patented silencer device.

Multiple Electric Products Co., Inc.
Sales Office: 450 Fourth Ave., New York

Quick Action

Modern business demands it. Time is the most valuable asset of the executive.

STROMBERG-CARLSON
INTER-COMMUNICATING SYSTEMS

add hours to the business day—eliminate loss of precious minutes—save endless unnecessary footsteps.

They are easily installed—require no switchboard or operator. Their operation is simplicity itself.

Push *ONE* Button *ONCE*—and Talk.

Dixie Electric Equipment Co.

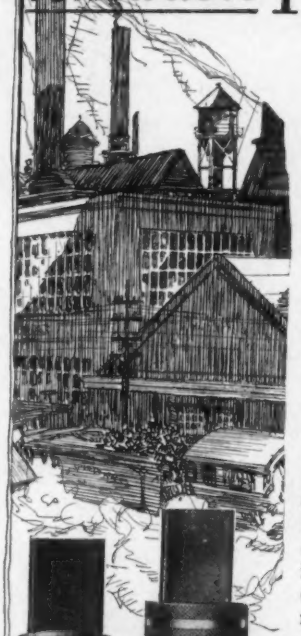
INDUSTRIAL ELECTRICAL EQUIPMENT

Interior Telephones—Fire Alarm Apparatus.
Watchman's Clock Detectors.
Electric Clocks—Riot Alarms—Code Calling Systems.
A Southern Concern—Giving Service to the South.
Data and Complete Information on Request.

37 Peters St. **Bell Phone Main 826.**
ATLANTA, GA.

Where every Working minute means money, blown fuses cut profits unless electrical circuits are protected by

ECONOMY *renewable* FUSES



INDUSTRIES using electrical energy operate most efficiently when delays in machine operation are unnecessary while blown fuses are being replaced.

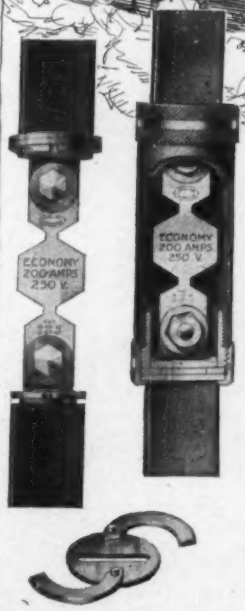
Economy Fuses are used by thousands of industries because they permit of renewal in minimum time at minimum cost.

Where greater efficiency is required a reserve stock of fuses is kept on hand and used in case of blowouts. The blown fuse is then restored to duty at leisure by simply inserting a new Economy "Drop Out" Renewal Link.

Economy Fuses cut annual fuse maintenance costs 80% as compared to the use of "one-time" fuses.

The fibre cartridge, the winged washers which lock the fuse, and the threaded end caps which complete the assembly are virtually indestructible and are used over and over again.

Economy was the first line using inexpensive bare renewal links for restoring blown fuses to their original efficiency to be *Approved In All Capacities* by the Underwriters' Laboratories.



For sale by all leading electrical jobbers and dealers

Economy Fuse & Mfg. Co.
Chicago - U. S. A.

Economy Fuses are also made in Canada at Montreal.

Speed in Service is Only Rivaled by Accuracy
Each Would Be Useless Without the Other

Unfailing Service

In the struggle and stress of modern business life every moment of delay represents a loss of time and money which cannot be regained.

When promptness, accuracy and dispatch are the vital elements in the delivery of electric equipment or supplies it is natural to turn to the Carter Electric Company for service.

This is an organization whose members are trained to meet the demands of any emergency and this organization is ready to serve you on an instant's notice.

If your requirements cover Rubber Conduit Wire, Switches, Safety Switches, Wiring Devices, Fuses, Lamps or other electric supplies, it is only a matter of a few hours before we can place them in your hands.

This is because our warehouses are always fully stocked—everything you may need and in large quantities—and with every modern facility for handling your business the Carter Electric Company pledges you **Unfailing Service.**

Carter Electric Company

63 Peachtree Street, Atlanta

Protect Your Lamps

From Breakage and Theft
Your Property from Fire

Inexpensive Security Against Danger — Losses — Delays

FLEXCO-LOK

TRADE MARK REGISTERED U.S. PAT. OFFICE

Lamp Guards

Mechanically Perfect
Easiest to Put On—Best in Service

Flexco-Lok Steel Lamp Guards are of expanded sheet steel heavily plated with non-corroding tin. Very simple in adjustment. Halves open on riveted hinges in base; close over lamp locking screws in collar. Strongly reinforced.

All Sizes—Locking or Plain

Flexco-Lok Steel Lamp Guards are made for all sizes of lamps for either standard brass or weatherproof sockets. Self-retaining lock screws in Flexco-Lok Guards lock with a key preventing unauthorized removal. We make also Flexco Steel Lamp Guards exactly the same construction, types and sizes but with plain round head screws.

Ask Your Dealer—or Write Us

Write today. We will send you prices, sample 40 watt guard and full details regarding Flexco-Lok Steel Lamp Guards.

Jobbers—Get these excellent products for your trade.

FLEXIBLE STEEL LACING COMPANY
530 South Clinton Street Chicago, Illinois

BRYAN ELECTRIC COMPANY

58 Edgewood Avenue, Atlanta, Ga.

Electric Light, Power, Telephone and Bell Wiring for Residences, Stores and Factories. Estimates Furnished.

Rewinding for Motors, Generators

All kinds of new and used Electrical Machinery bought, sold and exchanged.

All Kinds of Electrical Work

MOTORS RENTED TELEPHONE YOUR WANTS
LOCAL AND LONG DISTANCE, Ivy 1788-1790.

SOUTHERN BUSINESS DIRECTORY

WELDING & REPAIRS

SOUTHERN WELDING & MACHINE CO.
190 COURTLAND STREET ATLANTA, GA.
Gear Cutting and Machine Work.
No job too large or too small for us.
We specialize in cotton mill and oil mill welding and machine work.
Oxy-Acetylene and Electric Welding

SUPPLIES, MISC.

STENCILS — METAL CHECKS — RUBBER STAMPS
Send for Catalogue
Stencil Work for Cotton Mills Our Specialty
SOUTHERN STAMP & STENCIL CO.
7 W. Mitchell St.
ATLANTA
GA.

Dairy Supplies & Equipment
Leading Dairy Supply House of the South
(Established 1895)
Write Dept. E for new catalog and free "Dairy Hnad Book."
"PROMPT SERVICE" IS OUR MOTTO
Dairy & Farm Supply Co.
Atlanta, Ga.

THE WORLD MFG. CO.
Atlanta, Ga.
Manufacturers of
"OLD BUCK" Sizing Compounds
Oil Soap
Auto Soap
Soft Soaps
Dairy Powders
Soap Powders-
Scouring Powders
Disinfectants and
Sweeping Compounds
Phone Ivy 6082-J.

COTTON, WASTE, LINTERS, Etc

International Cotton Products Company
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Branches:
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Warehouses:
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COTTON COTTON WASTE LINTERS

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E. A. CUTTS COMPANY
Cable Address: "CUTTS"
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Office Phones—478—2713—Postal Phone
Long Distance—9929
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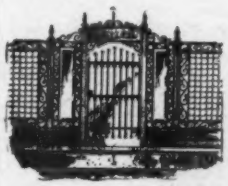
CONSTRUCTION

Cast Iron Columns
FOR
COTTON MILL CONSTRUCTION
American Cast Iron Pipe Company
COLUMN DEPARTMENT BIRMINGHAM, ALA



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WINDOW GUARDS
WIRE CLOTH
Established 1835.
DUFUR & CO.
309 N. Howard St., Baltimore, Md.

PLUMBING and HEATING
POWER & HAND PUMPS DAIRY SUPPLIES
PROMPT SERVICE.
HACKNEY BROTHERS CO.
No. 6 West 5th St., Charlotte, N. C.

Advertising conserves the Manufacturer's time by acquainting him with a service or product at his leisure long before the need for such arises.

Commission Merchants, Yarn Dealers, Cotton Dealers, and Brokers, Etc.

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Southern Cotton Yarn Co., Inc.

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SELLING AGENTS FOR

SOUTHERN MILLS

Carded—Combed Yarns

4's TO 120's SINGLE AND PLY

Selling Direct to Consumer.
NEW ACCOUNTS SOLICITED.

Weimar Bros.

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Works, 2046-48 Amber Street,
PHILADELPHIA, PA.

MANUFACTURERS OF
Cotton Mercerized Tapes, Spool Tapes, Bindings and Narrow Fabrics for Underwear and other Trades.

ESTABLISHED 1872

H. & B. BEER

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IMPORTER AND COMMISSION MERCHANT

LINEN YARNS

For Weaving, Knitting and all Purposes

TURKEY RED YARNS

For Towel Borders, Towellings and Bleaching Cloth

Linen Jacquard Harness Twine

And Every Description of Linen Thread and Twine

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43-45 WORTH STREET, NEW YORK

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NEW YORK CITY U. S. A.

WORLD-WIDE DISTRIBUTOR OF COTTON FABRICS

COTTON FABRICS FOR HOME AND EXPORT

DOMESTIC BRANCH OFFICES

Boston Chicago San Francisco
Philadelphia St. Louis Greensboro
Baltimore

FOREIGN BRANCH OFFICES

Buenos Aires, Argentine Curacao, D. W. I. Caracas, Venezuela
Santiago, Chile
San Juan, Porto Rico Havana, Cuba Barranquilla, Columbia

The Recognized Standards of Quality
COTTON YARNS

Our Fine Yarns Make Fine Fabrics

The manufacturers of a number of America's well known textile products can vouch for the strength, uniformity, cleanliness, and better weaving and knitting qualities of our yarns.

The yarns we spin for knitting, weaving, laces and converting, are furnished in all twists on skeins, cones, tubes and warps:

36s to 80s Single and Ply Combed Peeler Right Twist. 36s to 50s Single and Ply Double Carded Peeler, Right or Reverse Twist.

20s to 60s, 2, 3, and 4 Ply, Combed Peeler, Reverse Twist.

Our products are sold direct and exclusively through our General Sales Offices:

131 East 23d Street,
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H. A. FLORSHEIM, Sales Manager
Long Distance Phone: Gramercy 812
New England Representative
H. D. Skinner,
212 Summer St. Boston, Mass.

Gray Manufacturing Co.
Arrow Mills, Inc.
Parkdale Mills, Inc.
Flint Manufacturing Co.
Arkray Mills, Inc.
Arlington Cotton Mills
Myrtle Mills, Inc.

IF YOU NEED BANKING SERVICE

in the South,
and especially in Georgia

You need The Citizens & Southern

Capital and Surplus $4,500,000

The Citizens & Southern system has completely equipped offices in Atlanta, Savannah, Macon and Augusta.

Each of these offices is connected with the others by direct private wires.

If you are a customer of either office, and want information or service of any kind from the other cities these wires and the complete organization are at your service.

Hundreds of direct correspondents all over the south makes it possible to give you practically the same service wherever you want it.

The Citizens & Southern Bank

Atlanta—Marietta at Broad

Savannah Macon Augusta

No account too large, none too small"

1865 The Oldest National Bank in the Southern States 1920

The Atlanta National Bank

FOR MORE THAN FIFTY YEARS the Atlanta National Bank has been in the forefront of SOUTHERN DEVELOPMENT.

Every Southern Industry or Enterprise, calculated to advance the general prosperity of this section has received every possible assistance from the Atlanta National.

This same spirit of service is today at the disposal of Atlanta National friends and customers.

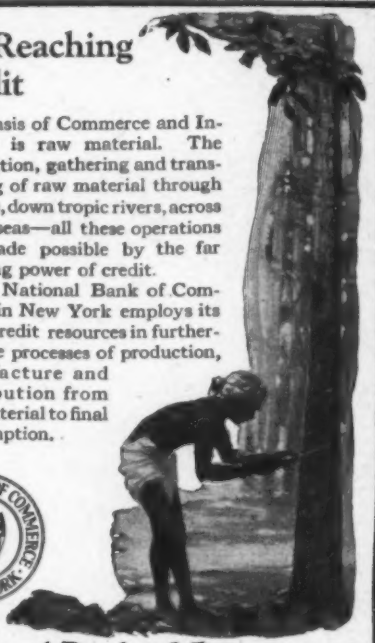
The Atlanta National Bank

Resources More than $30,000,000

Far Reaching Credit

The basis of Commerce and Industry is raw material. The production, gathering and transporting of raw material through jungles, down tropic rivers, across many seas—all these operations are made possible by the far reaching power of credit.

The National Bank of Commerce in New York employs its great credit resources in furthering the processes of production, manufacture and distribution from raw material to final consumption.



NATIONAL BANK OF COMMERCE 1839 IN NEW YORK

National Bank of Commerce
in New York
Capital, Surplus and Undivided Profits
Over Fifty-five Million Dollars

Factors

TEXTILE BANKING COMPANY
INCORPORATED
50 Union Square New York
Inaugurated by GUARANTY TRUST COMPANY OF NEW YORK
and LIBERTY NATIONAL BANK OF NEW YORK

HOTEL Sinton

CINCINNATI

THE courtesy of the Hotel Sinton's personnel and the fine cuisine of this modern hostelry are points of note among commercial travelers and tourists.

THE HOTEL SINTON offers extensive accommodations. A fine, new 300-room wing is to be completed July 20, 1920.

Cincinnati's Leading Hotel
700 Rooms, all with Bath or Shower.

Management
JOHN L. HORGAN

Do You Want to Sell It?

Probably you, like many other plants, have some equipment or machinery which you have taken out, or are thinking of taking out and replacing with new equipment.

Why not dispose of that second-hand equipment at a profit? COTTON is read by thousands of textile men, and perhaps that equipment is just what one of them wants.

You Can Sell Your Second-Hand Equipment

to these plants through advertising in the Classified Opportunities Section of COTTON. Such advertising produces results at small cost—why not try it out and get that second-hand equipment off your hands in a profitable way? Tell us what you have for sale and let us insert an advertisement for you.

COTTON

Grant Building, Atlanta, Ga.

Classified Opportunities.

BUSINESS OPPORTUNITY.

A wonderful opportunity is offered one or two live, experienced cotton men to join me in the erection of a large plant at Samson, Ala. 50,000 bales grown within a radius of thirty miles. Staple 1⅞", running 80% middling. Splendid power site on Pea River, excellent labor conditions, cheap living. Best proposition in the country today. Address T. A. Hunter, Samson, Alabama.

Positions Open

HELP WANTED—MALE.

Experienced superintendent and executive. One capable of handling a large mill. Give full particulars in reply. Confidential. Box 26, care COTTON, Atlanta, Ga.

Positions Wanted

WANTED—Position as superintendent in a small mill or overseer of carding in a large mill. Have had seven years experience as overseer of carding in large mills; also experience in spinning and weaving. Textile graduate, 1909. Can handle almost any position in a mill. Can furnish first class references as to character and ability. Address Box 17, care COTTON, Atlanta, Ga.

RATES:

WITHOUT DISPLAY.

"Positions Wanted" 3 cents per word per insertion. Minimum charge 50 cents. Payable in advance.

"Positions Open" and other undisplayed advertisements, 4 cents per word per insertion. Minimum charge $1.00. Payable in advance.

(When replies are to be received in our care, allow four words for box address.)

DISPLAYED.

"For Sale" and all other advertisements using bold-face type or otherwise displayed, $2.00 per inch per insertion.

Rates for larger spaces furnished on application.

Wanted—Salesmen.

Salesmen calling on the textile mills, and interested in new lines of machinery, paints, building supplies or chemicals, either as a side line or exclusively will find it profitable to write, giving experience, territory covered and other details. Correspondence strictly confidential. Cotton, 1021 Grant Building, Atlanta, Ga.

For Sale

New and Second Hand

ENGINES

Corliss Automatic and Slide Valve

BOILERS

Pumps, Hoisting Engines, Gas and Gasoline Engines.

MACHINE TOOLS

Lathes, Planers, Shapers, Drill Presses, etc.

WOOD WORKING

Planers, Molders, Band Saws, etc.

ELEC. MACHINERY

Dynamos and Motors

AND SUPPLIES OF ALL KINDS

FRANK TOOMEY, Inc.,

127-31 N. Third St.

Philadelphia, - Pennsylvania

Miscellaneous

S. S. STORER, M.E., C.E.
Complete plans for
Textile Mills, Commercial Buildings, Bridges.
Personal Attention, Fees Reasonable.
Atlanta, Ga.

SECOND-HAND MACHINERY FOR SALE

LAPPERS

1—40" 2 beater Kitson breaker with feeder.
1—40" 1 beater Saco Lowell finisher.
1—40" 2 beater Pollard & Johnson breaker with feeder.
2—40" 1 beater Atherton Finisher.
4—40" H & B Finishers.

CARDS

4—40" Hetherington.
12—37" H & B.
1—60" 3 cylinder garnett.
3—40" wool.
2—Kitson threaded extractors.
1—24" Kitson 1 cylinder Burr Picker.

DRAWINGS

2—Pettee, 6 deliveries each 10" coil, leather roll.
18—Whitin, 4 deliveries 12" coil, leather roll.
10—Whitin, 6 deliveries 12" coil, leather roll.

SLUBBERS

2—12x6 Saco water power, fall delivery.
2—11x5½ Saco water power, 60 spindles.
1—11x5¼ Hetherington 48 spindles.
1—11x5½ Lowell 40 spindle.

INT. SPEEDERS

4—9x4½ Saco water power, 100 spindles each. Fall delivery.
6—9x4½ Saco Pettee, 84 spindles each.
1—9x4½ Lowell, 96 spindles each.

SPEEDERS

5—8x4 Providence, 104 spindles each. Summer delivery.
2—8x3½ Saco water power, 128 spindles each. (Fall).
2—8x4 Herthington, 120 spindles each.
2—8x4 Hetherington, 120 spindles each.

SPINNING

4—Lowell, 2¾ gauge 1¾ rings, 144 spindles each.
23—Whitin, 2¾ gauge 1¾ rings, 194 spindles each.

SPOOLERS

1—4x6 Whitin 100 spindle.
3—4x6 Lowell, 60 spindles each.
3—4x6 Lowell, 100 spindles each.

WINDERS

3—No. 6 Foster, 100 spindles each.
10—Lowell Cam'ins, 16 spindles each.
6—No. 50 Universal.

WARPERS

4—Hopedale Section beam warper.
1—Entwistle Ball warper.
1—Lowell Section Beam Warper.
1—double head single linker.
1—double head double linker dewn.
1—double Ball attachment for warper.

TWISTERS

4—192 spindle Hopedale, 3⅛" gauge, 2" rings, creel for 4 ply.
1—192 spindle F & J wet twisters, 2¾ gauge 1¾ rings.
1—220 H & B wet twisters, 3¼ gauge 2¼ ring.
2—280 spindle Draper twister 3½ gauge 2¼ rings.
1—Tod rope machine with double former.
1—Haskell & Dawes Rope Machine, 2 formers, 1 coiler, producing 1600 lbs. per day.

CLOTH ROOM MACHINERY

1—40" C & M Brusher.
1—40" C & M Calender.
1—40" Folder.
1—40" Lowell Folder.

LOOMS

42—40" Whitin equipped 5 to 16 harness.
150—24" A—Model Draper automatic.
150—32" E—Model Draper automatic.
74—40" plain Mason, practically new.
12—40" Crompton & Knowles, equipped for ginghams.
98—37½ Crompton & Knowles, 2 to 5 harness.

MISCELLANEOUS

1—new Hirom bobbin cleaner.
1—new 20-spindle Payne Winder.
10,000 filling bobbins, No. 2 Draper spindle.
10,000 4x6 twister bobbins, wood or metal head.
2500 filling twister bobbins for Draper twisters.
10,000 warp spinning bobbins.
5000—3 ring filling quills for No. 2 Draper spindle.
7000—2 ring filling quills for Whitin Gravity spindle.
117 ft.—38" 3 ply leather belt.
25 ft.—9" 2 ply leather belt.
75 ft.—8" 2 ply leather belt.
25 ft.—6" 2 ply leather belt.
500—10" Roving Cans.
1—36" Kitson Condenser with pipe and fan.
40—Gordon & Hay Card Attachment for H & B Cards.
3—Dazey Yarn Pressers, double screw.
1—Small hand post drill.
1—Hose extractor direct connected 30" copper basket.
1—48" broad bent extractor copper basket, steam driven.
1—William Firth Co. Card Stripper for 40" card.
3—No. 5 B. Suction Fans.
1—15" Sturtevant Fan.
1—No. 6 15" Sturtevant Fan.
2—New Whitin gear cutters.

Write or Wire ATLANTA TEXTILE MACHINERY CO., AUSTELL BLDG., ATLANTA, GA.

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Standard Gas Products Co.
Waterhouse Welding Co.
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National Shawmut Bank.
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Refinite Co.
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International Engineering Co.
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Lunkenheimer Co.
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Brake Linings.
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Felton, S. A. & Son Co.
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Cement and Brick Coating.
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Tropical Paint Co.
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Centrifugals.
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Chain (Block, Bicycle, Auto Engine, Agricultural, Etc.)
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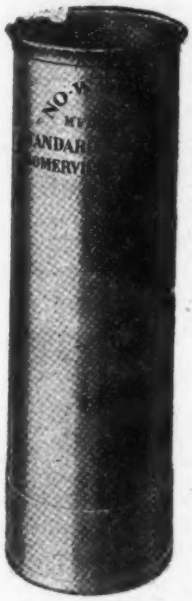

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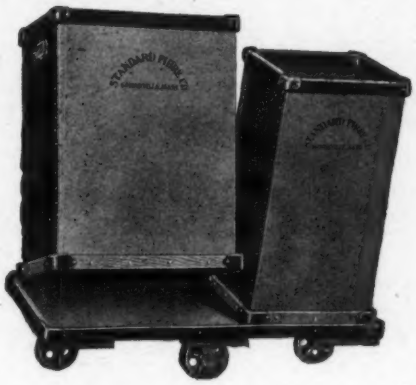

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Textile Finishing Machinery Co., The
Tolhurst Machine Works.
Dye Sticks.
Phila. Drying Machinery Co.
Dyestuffs and Chemicals.
Althouse Chemical Co.
Aniline Dyes & Chemicals, Inc.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Atlantic Dyestuff Co.
Barrett Co.
Borne, Scrymser Co.
Bosson & Lane.
Dow Chemical Co.
Du Pont de Nemours & Co., E. I.
Electro Bleaching Gas Co.
Grasselli Chemical Co.
Hemingway Inc., Frank
Kali Mfg. Co.
Klipstein & Co., A.
Lewis, John D.
Metz & Co., H. A.
Moore Oil Refining Co.
National Aniline & Chemical Co.
National Oil Products Co.
Newport Chemical Works, Inc.
Roessler & Hasslacher Chemical Co.
Sur-Dass Chemical Co.
United Chemical Products Corp.
Wolf & Co., Jacques
Electors.
Sherwood Mfg. Co.
Electric Dynamos and Motors.
(See Motors and Generators.)
Electric Fans.
(See Fans—Electric.)
Electric Lamps.
(See Lamps.)
Electric Lamp Guards.
Flexible Steel Lacing Co.
Electrical Engineers and Contractors.
Dixie Electrical Equipment Co.
Huntington & Guerry, Inc.
Imperial Electric Co.
Electrical Machinery and Supplies.
Adams-Bagnall Electric Co.
Allis-Chalmers Mfg. Co.
Atlas Electric Devices Co.
Benjamin Electric Co.
Bryan Electric Co.
Carter Electric Co.
Crouse-Hinds Co.
Crymes Mchry. & Supply Co.
Dixie Electrical Equipment Co.
Economy Fuse & Mfg. Co.
Fulton Supply Co.
General Electric Co.
Hulme, J. S.
Jones Mchry. Corp.
Multiple Electric Products Co.
Phila. Electric Co.
Seeger Machine Tool Co.
Walraven Co., The
Walsh & Weidner Boiler Co.
Westinghouse Electric & Mfg. Co.
Electrical Repairing (all kinds).
Bryan Electric Co.
Dixie Electrical Equipment Co.
Electric Tractors and Trucks.
(See Tractors & Trucks—Elec.)
Elevators.
Collins, J. D.
Link-Belt Company.
Seeger Machine Tool Co.
Enamel—Mill White.
(See Paint—Mill White.)
Engineers (Mill).
(See Architects.)
Engines—Oil, Gas and Gasoline.
Crymes Mchry. & Supply Co.
Seeger Machine Tool Co.
Engines—Steam.
Allis-Chalmers Mfg. Co.
Crymes Mchry. & Supply Co.
Fulton Supply Co.
Jones Mchry. Corp.
Lombard Iron Works & Supply Co.
Schofield's Sons Co., J. S.
Toomey, Frank
Walsh & Weidner Boiler Co.
Engine Room Appliances and Supplies.
Crane Co.
Crymes Mchry. & Supply Co.
Fulton Supply Co.
Goodyear Tire & Rubber Co.
Graton & Knight Mfg. Co.
Jenkins Bros.
Jones Mchry. Corp.
Lunkenheimer Co.
Sherwood Mfg. Co.
Walraven Co.
Exporters (Cotton).
(See Brokers.)
Extractors—Hydro.
American Laundry Mchry. Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Machine Works.
Fans—Electric.
Allis-Chalmers Mfg. Co.
American Blower Co.
Benjamin Electric Co.
Bryan Electric Co.
Carter Electric Co.
General Elec. Co.
Westinghouse Elec. & Mfg. Co.
Fans—Conveying, Power and Exhaust.
(See Blowers and Blowing Systems.)
Fasteners (Belt).
(See Belt Fasteners.)
Feed Water Purifiers.
(See Water Softeners.)
Felting Machinery.
Smith & Furbush Mch. Co.
Fence—Steel and Iron.
American Cast Iron Pipe Co.
Anchor Post Iron Works.
Cyclone Fence Co.
Fibre Products.
Diamond State Fibre Co.
Keystone Fibre Co.
Rogers Fibre Co.
Standard Fibre Co.
Filters—Water.
(See Water Softening.)
Finishing.
(See Dyers, Bleachers and Finishers.)
Finishing, Bleaching and Sizing Materials.
Althouse Chemical Co.
Atlantic Dyestuff Co.
Aniline Dyes & Chemical, Inc.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Barrett Co.
Borne, Schrymser Co.
Bosson & Lane.
Corn Products Refining Co.
Dobbins Soap Mfg. Co.
Dow Chemical Co.
Du Pont de Nemours & Co., E. I.
Electric Smelting & Alum. Co.
Electro Bleaching Gas Co.
Grasselli Chemical Co
Kali Mfg. Co.
Keever Starch Co.
Klipstein & Co., A
National Oil Products Co.
Newport Chemical Works.
Metz & Co., H. A.
Moore Oil Refining Co.
National Aniline & Chemical Co.
Roessler & Hasslacher Chemical Co.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques
World Mfg. Co.
Fire Alarm Apparatus.
Dixie Electric Equip. Co.
Fire Doors.
Richards-Wilcox Mfg. Co.
Fire Door Hardware (Automatic).
Richards-Wilcox Mfg. Co.
Fire Escapes (Spiral).
Collins, J. D.
Fire Hose.
(See Paint—Fireproof.)
Fire Protecting Paint.
(See Hose—Fire.)
First Aid Room Equipment.
(See Hospital Equipment.)
Flexible Couplings.
Cresson-Morris Co.
Flood Lights (Elec.)
Crouse-Hinds Co.
Flooring (Hardwood).
Kirkpatrick Lum. & Timber Co.
Nashville Hardwood Flooring Co.
Southern Cypress Mfg. Co.
Floor Scrubbing Machine.
American Scrubbing Machine Co.
Fluted Rolls.
Campbell Mfg. Co.
Howard & Bullough.
Perkins & Son, B. F.
Saco-Lowell Shops.

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Southern Spindle & Flyer Co.
Whitin Machine Works.

Flyers.
Howard & Bullough.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

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Cresson-Morris Co.
Fountains (Drinking).
Central Brass Mfg. Co.
Crane Co.
Jewett Refrigerator Co.
Mfg. Equipment & Eng'g Co.
Mott-Southern Co.
Rundle-Spence Mfg. Co.
Southern States Supply Co.
Taylor Co., Halsey W.
Friction Clutches.
(See Clutches—Friction.)
Fuses.
(See Elec. Mchy. and Supplies.)
Garage Door Hardware.
Richards-Wilcox Mfg. Co.
Garnett Machines.
Roy Son Co., B. S.
Smith & Furbush Mach. Co.
Gas Engines.
(See Engines—Gas.)
Gasoline Tanks and Pumps.
Wayne Oil Tank & Pump Co.
Gaskets.
Diamond State Fibre Co.
Graton & Knight Mfg. Co.
Gauge Cocks.
Lunkenheimer Co.
Gauges—Draft.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.
Gauges—Mercury Column Vacuum.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.
Gauges—Oil.
Lunkenheimer Co.
Gauges (Pressure).
Tagliabue Mfg. Co., C. J.
Gauges (Recording).
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co
Gauges—Water.
Lunkenheimer Co.
Gears—Silent.
Diamond State Fibre Co.
General Electric Co.
Link-Belt Company.
Morse Chain Co.
Gear Cutting and Cutters.
Cresson-Morris Co.
Southern Welding & Machine Co.
Reischmann Co.
Whitin Mch. Co., D. E.
Gear Pullers.
Greb Co., Inc.
Generators—Electric.
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Governors (Pressure).
Tagliabue Mfg. Co., C. J.
Governors (Pump).
Tagliabue Mfg. Co., C. J.
Graphite—Products.
Dixon Crucible Co., Jos.
Grates (Boiler).
International Eng. Works.
Lombard Fdy. & Mch. Co.
McNaughton Mfg. Co.
Grease.
(See Lubricants.)
Grease Cups.
(See Lubricators.)
Green Houses.
Hulme, J. S.
Grindstones.
Richards-Wilcox Mfg. Co.
Grinders—Card, Cylinder Roll, Napper and Garnett.
(See Card Grinding Machinery.)
Guards (Elec. Lamp.)
Flexible Steel Lacing Co.
Guides (Thread).
Mitchell-Bissell Co.
Palmer Co., I. E.
Gums.
(See Finishing and Sizing Materials.)
Hangers.
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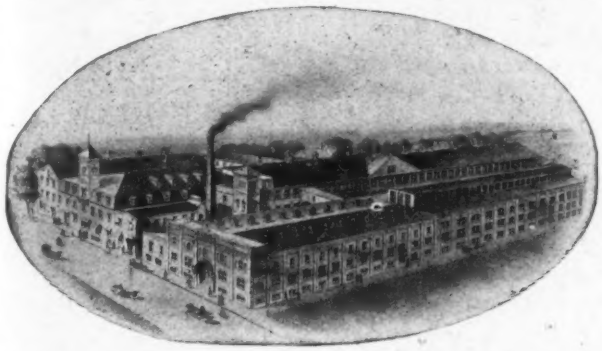
Harness—Looms.
American Supply Co.
Crompton & Knowles Loom Wks.
Emmons Loom Harness Co.
Garland Mfg. Co.
Heads (Bobbin & Spool).
Diamond State Fibre Co.
Heating and Ventilating Apparatus.
(See Ventilating Apparatus.)
Heddles.
Crompton & Knowles Loom Wks.
Draper Corporation.
Steel Heddle Mfg. Co.
Heddle Frames.
Crompton & Knowles Loom Wks.
Steel Heddle Mfg. Co.
Hinges & Butts.
McKinney Mfg. Co.
Hoists.
General Utilities Co.
Hulme, J. S.
Link-Belt Company.
Morse Chain Co.
Pasco Tool Co.
Seeger Machine Tool Co.
Walraven Co.
Hose—Fire.
Collins, J. D.
Fulton Supply Co.
Goodyear Tire & Rubber Co.
U. S. Rubber Co.
Hosiery Dyeing Machinery.
Cocker Mch. & Fdry. Co.
Rome Mach. & Fdry. Co.
Hosiery Finishing Boards.
(See Boards.)
Hosiery Forms.
(See Drying Forms.)
Hosiery Yarns.
(See Yarn Manufacturers.)
Hospital Equipment.
Thomas Co., F. H.
Wright Co.
Hotels.
Sinton.
Houses (Ready-Made).
(See Bungalows.)
Humidifying Apparatus.
American Blower Co.
Carrier Eng. Corp.
New York Blower Co.
Parks-Cramer Co.
Sturtevant Co., B. F.
Humidity Indicating Instruments.
Powers Regulator Co.
Tagliabue Mfg. Co., C. J.
Taylor Inst. Co.
Hydraulic Turbines.
(See Turbines—Steam.)
Hydro Extractors.
(See Extractors.)
Hydrometers.
Taylor Instrument Co.
Hygrometers.
Taylor Instrument Co.
Hygrodeiks.
Taylor Instrument Co.
Indicating and Recording Instruments and Thermometers.
Powers Regulator Co.
Taylor Instrument Co.
Tagliabue Mfg. Co., C. J.
Indigo.
(See Dyestuffs and Chemicals.)
Injectors.
Lunkenheimer Co.
Sherwood Mfg. Co.
Insulation (Vulcanized Fibre).
Diamond State Fibre Co. Sai
Insurance.
Miller Indemnity Underwriters.
Ink—Stencil and Marking.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.
Lovingood Co.
National Marking Machine Co.
Regnas & Co., J. R.
Iron Work—Ornamental.
American Cast Iron Pipe Co.
Anchor Post Iron Works.
Cyclone Fence Co.
Dufur & Co.
Lombard Iron Works & Supply Co.
Jacks.
Paulus, Chas. B.
Jacquards.
Crompton & Knowles Loom Wks.
Jute Bagging Machines.
Smith & Furbush Mach. Co.
Kettles—Size.
(See Size Kettles.)
Kettles—Soda.
Lombard Iron Works & Sup. Co.
Kiers.
(See Bleaching Kiers.)
Knit Goods.
(See Cotton Cloth Commission Merchants and Dealers.)
Knit Goods Washers.
(See Washers—Cloth.)
Knitting Machinery and Supplies.
Adams Co., Geo. H.
Brinton Co., H.
General Machine Works.
Hemphill Mfg. Co.
Scott & Williams.
Wildman Mfg. Co.
Laboratory Instruments & Thermometers.
Tagliabue Mfg. Co., C. J.
Lacing (Belt).
(See Belt Lacing.)
Lamps—Incandescent and Arc.
Adams-Bagnall Electric Co.
Benjamin Electric Co.
Boston Economy Lamp Div.
Bryan Electric Co.
Carter Electric Co.
Crouse-Hinds Co.
Jones Mchry. Corp.
General Electric Co.
Walraven Co.
Westinghouse Lamp Co.
Lamp Guards (Key Locking).
Flexible Steel Lacing Co.
Lamp Reflectors.
Adams-Bagnall Electric Co.
Benjamin Electric Co.
Bryan Electric Co.
Carter Elec. Co.
Crouse-Hinds Co.
Ivanhoe-Regent Works.
Landscape Architects.
(See Village Architects.)
Lappers.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Whitin Machine Works.
Latch Needles.
Paulus, Chas. B.
Laundry Machinery.
American Laundry Mchry. Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Machine Wks.
Lavatories.
Crane Co.
Mfg. Equipment & Eng'g Co.
Taylor Co., Halsey W.
Jos. A. Vogel Co.
Leather Belting.
(See Belting.)
Leather Specialties.
American Supply Co.
Graton & Knight Mfg. Co.
Jewell Belting Co.
Ladew & Co., Inc., Edw. R.
Williams & Sons, I. B.
Lights (Flood).
Crouse-Hinds Co.
Linen Yarns.
(See Yarns—Linen.)
Link Belting.
(See Belting—Linen.)
Linters.
(See Waste Dealers.)
Liquid Chlorine.
(See Chlorine.)
Loaders—Wagon and Trucks.
Link-Belt Company.
Portable Machinery Co.
Locks and Latches.
Richards-Wilcox Mfg. Co.
Lockers (Metal).
Collins, J. D.
Medart Mfg. Co., Fred.
Logwood Extract.
(See Dyestuffs and Chemicals.)
Looms.
Crompton & Knowles Loom Wks.
Draper Corporation.
Fletcher Works.
Jones Mchry. Corp.
Mason Machine Works.
Saco-Lowell Shops.
Schaum & Uhlinger.
Schofield, Wm. & Co.
Stafford Co., The
Loom Attachments (Automatic).
Draper Corporation.
Loom Harness.
(See Harness.)
Lumber (See Building Material).
Lubricants.
Dixon, Jos., Crucible Co.
N. Y. & N. J. Lubricant Co.
Swan & Finch Co.
Texas Co.
Lubricant, Tanks and Pump.
Wayne Oil Tank & Pump Co.
Lubricators.
Lunkenheimer Co.
N. Y. & N. J. Lubricant Co.
Sherwood Mfg. Co.
Lug Straps.
(See Straps—Lug.)
Lumber.
Kirkpatrick Lum. & Timber Co.
Southern Cypress Mfg. Asso.
Lunch Room Equipment.
(See Restaurant.)
Machine Tools.
(See Tools.)
Machinists.
Cresson-Morris Co.
Marking (Dry Transfer).
Kaumagraph Co.
Marking Pots, Stencils, Inks, Etc.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.
Lovingood Co.
National Marking Machine Co.
Regnas & Co., J. R.
Marking Machines.
National Marking Machine Co.
Mercerized Yarns.
(See Yarns Mercerized.)
Mercerizing Machinery.
Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co.
Metal Ceilings, Etc.
Lupton's Sons Co., David
Metals (Perforated).
(See Screens and Sieves.)
Metal Workers—Sheet.
Lombard Iron Works & Supply Co.
Meters—Flow, Air, Gas, Electric, Steam, Etc.
Allis-Chalmers Mfg. Co.
Benjamin Electric Co.
Bryan Electric Co.
Carter Electric Co.
General Electric Co.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.
Westinghouse Elec. & Mfg. Co.
Meters (Revolution).
Taylor Instrument Co.
Mill Baskets and Boxes.
(See Boxes—Mill.)
Mill Engineer.
(See Architects and Engineers.)
Mill Villages.
(See Villages.)
Mill Supplies (Misc.).
(See Supplies—Mill).
Mill White Paint.
(See Paint—Mill White.)
Monorail Conveying Systems.
Richards-Wilcox Mfg. Co.
Motors and Generators—Electric.
Adams-Bagnall Electric Co.
Allis-Chalmers Mfg. Co.
Bryan Electric Co.
Carter Electric Co.
Crymes Mchry. & Supply Co.
Dixie Electrical Equipment Co.
Fulton Supply Co.
General Electric Co.
Hulme, J. S.
Jones Mchry. Corp.
Seeger Machine Tool Co.
Walraven Co., The
Westinghouse Elec. & Mfg. Co.
Moving Picture Mach. & Supplies.
Southern Theatre Equip. Co.
Mule Stands.
Transmission Ball Bearing Co.
Nails—Cement Coated.
Lovingood Co.
Regnas Co., J. R.
Nappers.
Roy & Son Co., B. S.
Needles—Latch.
Paulus, Chas. B.
Oils.
Hampden Paint & Chem. Co.
Wadsworth, Howland & Co., Inc.
Oils—Finishing
(See Finishing and Sizing Materials.)
Oils—Lubricating.
(See Lubricants.)
Oil Cups.
(See Lubricators.)
Oil Paper.
Bradley Mfg. Co., A. J.
Oil Tanks & Pumps.
Wayne Oil Tank & Pump Co.
Oil Testing Instruments.
Tagliabue Mfg. Co., C. J.
Oiling Devices.
(See Lubricators.)
Openers for Cotton, Wool, Waste Etc.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Works.
Oxidizing Machinery.
Phila. Drying Machinery Co.
Oxygen.
Commercial Acetylene Supply Co.
Linde Air Products Co.
Oxweld Acetylene Co.
Prest-O-Lite Co.
Standard Gas Products Co.
Waterhouse Welding Co.
Package Tying Machine.
Bunn & Co., B. H.
Packing Boxes & Cases (Wooden).
Hightower Box & Tank Co.
Walke Box Co., Inc.
Wall & Son, C. M.
Packings.
Goodyear Tire & Rubber Co.
Graton & Knight Mfg. Co.
Jenkins Bros.
Walraven Co.
U. S. Rubber Co.
Paint.
Atlanta Gas Light Co.
Barrett Co., The
Cooledge & Sons, F. J.
Du Pont de Nemours & Co., E. I.
Gulf States Creosoting Co.
Hampden Paint & Chem. Co.
Hurst Co.
Johnson Paint Co.
Peaslee-Gaulbert Co., Inc.
Tropical Paint Co.
Wadsworth, Howland & Co., Inc.
Paper.
Bradley Mfg. Co., A. J.
Diamond State Fibre Co.
Perforated Metal.
(See Screens and Sieves.)



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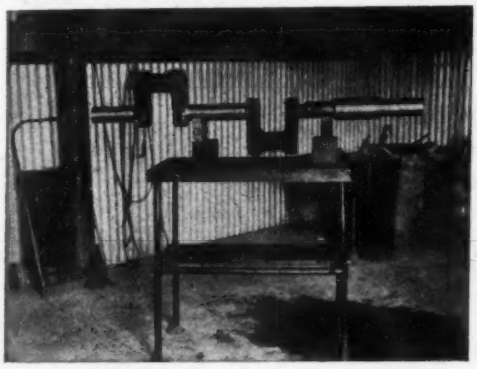

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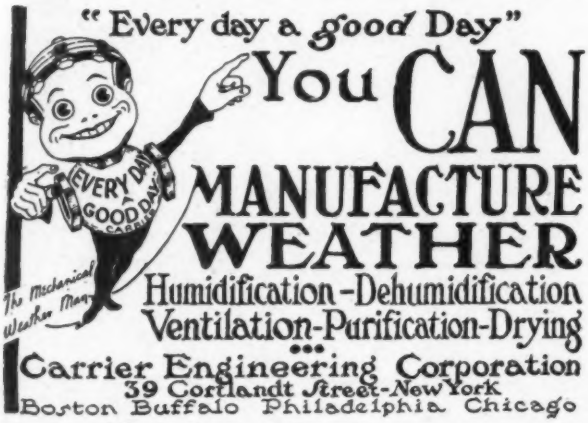

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Pianos & Players.
Scofield Auto Music Co.

Pickers—Curled Hair.
Schofield, Wm. Co.
Smith & Furbush Mach. Co.

Pickers—Leather.
Garland Mfg. Co.

Picker Sticks.
Garland Mfg. Co

Picking Machinery.
Howard & Bullough, Am. Machine Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Pinions.
Diamond State Fibre Co.

Pipe Fittings.
Crane Co.
Lunkenheimer Co.
Walraven Co.

Pipe Organs.
Scofield Auto Music Co.

Pipe Threading & Cutting Machines.
Seeger Machine Tool Co.
Walraven Co., The

Playground Equipment.
Hill-Standard Co.
Medart Mfg Co., Fred.

Pool Tables, Etc.
Brunswick-Balke-Collender Co.

Power Transmission.
Aldrich Mch. Wks.
Allis-Chalmers Mfg. Co.
Carlyle-Johnson Mch. Co.
Cresson-Morris Co.
Chicago Pulley & Shafting Co.
Crymes Mchry. & Supply Co.
Dodge Sales & Eng. Co.
Fulton Supply Co.
General Electric Co.
General Utilities Co.
Goodyear Tire & Rubber Co.
Graton & Knight Mfg. Co.
Hyatt Roller Bearing Co.
Jewell Belting Co.
Jones Mchry. Corp.
Ladew & Co., Inc., Edw. R.
Link-Belt Company.
Morse Chain Co.
New Departure Mfg. Co.
S K F Industries.
Seeger Machine Tool Co.
Standard Pressed Steel Co.
Stanley Belting Corp.
U. S. Ball Bearing Co.
U. S. Rubber Co.
Valley Iron Works.
Walraven Co., The
Westinghouse Elec. & Mfg. Co.
Williams & Sons, I. B.

Presses.
American Laundry Machnry. Co.
Bridge & Co., Ltd., David
Butterworth & Sons Co., H. W.
Economy Baler Co.
Gallard-Henning Mfg. Co.
Lovingood Co.
Phila. Drying Mch. Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Seeger Machine Tool Co.
Smith & Furbush Mch. Co.
Textile Finishing Machinery Co., The

Pulleys.
Chicago Pulley & Shafting Co.
Cresson-Morris Co.
Diamond State Fibre Co.
Dodge Sales & Eng. Co.
Link-Belt Company.
Seeger Machine Tool Co.
Valley Iron Works.
Walraven Co., The

Pulley Covering.
Goodyear Tire & Rubber Co.
Stanley Belting Corp.
Williams & Sons, I. B.

Pumps.
Allis-Chalmers Mfg. Co.
Jones Mchry. Corp.
Seeger Machine Tool Co.
Textile Finishing Machinery Co.
Toomey, Frank
Walraven Co.
Walsh & Weidner Boiler Co., The
Westinghouse Elec. & Mfg. Co.

Pump Oil).
Wayne Oil Tank &Pump Co.

Pump Valves.
(See Valve Discs.)

Psychrometers (Sling).
Taylor Instrument Co.

Pyrometers.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Quill Cleaning Machines.
Terrell Mch. Co.
Dufur & Co.

Receptacles (Fibre).
(See Fibre Products.)

Recording Instruments.
Powers Regulator Co.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Recorders (Draft).
Tagliabue Mfg. Co., C. J.

Recorders (Pressure).
Tagliabue Mfg. Co., C. J.

Recorders (Temperature).
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Reeds.
American Supply Co.
Emmons Loom Harness Co.

Reed Polishing Machines.
Shawmut Eng'g Co.

Reels.
Cocker Mch. & Fdry. Co.
Crompton & Kowles Loom Wks.
Draper Corporation.
Saco-Lowell Shops.
Schofield, Wm. Co.
Whitin Machine Works.

Reflectors (Lamp).
(See Lamp Reflectors.)

Regulators (Condensate).
Tagliabue Mfg. Co., C. J.

Regulators (Liquid Level).
Tagliabue Mfg. Co., C. J.

Refrigerating Machines.
Southern States Supply Co.

Regulators—Pressure.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Regulators—Temperature.
(See Temperature Controllers.)

Regulators (Time).
Tagliabue Mfg. Co., C. J.

Reinforcement Bars for Concrete.
Corrugated Bar Co.

Repairing (Electrical).
Jones Mchry. Corp.

Repairing (Textile Mchry, etc).
Atlanta Welding Co.
Chattanooga Brazing & Welding Co.
General Machine Works.
Southern Spindle & Flyer Co.
Standard Gas Products Co.

Restaurant Equipment.
Reischmann Co.
Wright Co.

Rib Top Cutters.
General Machine Works.
Wildman Mfg. Co.

Ring Travelers—Steel and Bronze.
Whitinsville Spining Ring Co.
Whitin Machine Works.

Rings—Spinning.
(See Spinning Rings.)

Rivets (Belt).
Crescent Belt Fastener Co.

Rocker Shaft Bearings.
(See Bearings.)

Rolls (Calender.)
Perkins & Son, B. F.
Roy & Son Co., B. S.

Rolls (Rubber Covered).
American Wringer Co.
Perkins & Son, B. F.

Rolls—Steel.
Perkins & Son, B. F.
Southern Spindle & Flyer Co.

Roofing.
Asphalt Roofing Co.
Atlanta Gas Light Co.
Barrett Co., The
Cooledge & Sons, F. J.
High-Grade Mfg. Co.
Cortright Metal Roofing Co.
Johnson Paint Co.
Kirkpatrick Lum. & Timber Co.
Peaslee-Gaulbert Co., Inc.
Wadsworth, Howland & Co.
Walraven Co.

Roofing Felt and Pitch.
Atlanta Gas Light Co.

Roof and Cement Coating.
Asphalt Roofing Co.
Atlanta Gas Light Co.
Barrett Co.
Cooledge & Sons, F. J.
Du Pont de Nemours & Co., E. I.
Hampden Paint & Chemical Co.
High-Grade Mfg. Co.
Horst Co.
Johnson Paint Co.
Peaslee-Gaulbert Co., Inc.
Tropical Paint Co.
Wadsworth, Howland & Co.

Rope—Transmission.
Cresson-Morris Co.
Dodge Sales & Eng. Co.
Link-Belt Company.
Walraven Co.

Roving Cans and Trucks.
(See Cans—Roving.)

Roving Machinery.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

Rubber Stamps.
(See Stamps, Stencils, Etc.)

Rubber Goods.
Goodyear Tire & Rubber Co.
U. S. Rubber Co.

Sanitary Products.
Crane Co.
Dail Steel Products Co.
Hackney Bros. Co.
Kaustine Co.
Rundle-Spence Mfg. Co.
Vogel Co., Jos. A.

Sash-Window—Steel.
Detroit Steel Products Co.
Lupton's Sons Co., David

Scales.
American Kron Scale Co.
Lovingood Co.
Standard Scale & Supply Co.
Torsion Balance Co.

Scale Preventer (Boiler).
(See Boiler Feed Water Purification.)

Screens & Sieves—Perforated.
Erdle Perforating Co.
Link-Belt Company.

Screwholes.
Stine Screw Hole Co.

Scrubbing Machine—Floor.
American Scrubbing Mch. Co.

Second Hand Machinery & Supplies.
Atlanta Textile Mchry. Co.
Crymes Mchry. & Supply Co.
Jones Mchry. Corp.
Toomey, Frank, Inc.
Walraven Co.

Sewing Machines.
Merrow Machine Co., The
Textile Finishing Mchy. Co.
Wilcox & Gibbs Sewing Mach. Co.

Shades (Electric Lamp).
(See Reflectors).

Shafting & Hangers.
Chicago Pulley & Shafting Co.
Cresson-Morris Co.
Dodge Sales & Eng. Co.
Fulton Supply Co.
Link-Belt Co.
Seeger Machine Tool Co.
S K F Industries.
Standard Pressed Steel Co.
Valley Iron Works.
Walraven Co., The

Shears.
Roy & Son Co., B. S.

Shelving—Sectional Steel.
Collins, J. D.
Hyatt Roller Bearing Co.
Lupton's Sons Co., David
Medart Mfg. Co., Fred.

Shingles—Asphalt.
Barrett Co.

Shingles—Metal.
Cortright Metal Roofing Co.

Shingle (Wood).
Kirkpatrick Lum. & Timber Co.
Southern Cypress Mfg. Asso.

Shipping Room Machinery and Supplies.
Acme Steel Goods Co.
American Kron Scale Co.
Atlanta Stamp & Stencil Works.
Baker, R. & L. Co.
Bradley Mfg. Co., A. J.
Bunn & Co., B. H.
Collins, J. D.
Diamond State Fibre Co.
Elwell-Parker Elec. Co.
Fulton Supply Co.
Hightower Box & Tank Co.
Hulme, J. S.
Keystone Fibre Co.
Lane & Bro., W. T.
Lovingood Co.
McKinney Mfg. Co.
Regnas & Co., J. R.
Rogers Fibre Co.
Standard Scale & Supply Co.
Standard Fibre Co.
Seeger Machine Tool Co.
Signode System, Inc.
Torsion Balance Co.
Walraven Co., The
Walke Box Co., Inc.
Wall & Son, C. M.

Shower Baths.
Crane Co.

Shuttles.
Brown Co., David
Crompton & Knowles Loom Wks.
Draper Corporation.
Shambow Shuttle Co.

Sinkers.
Paulus, Chas. B.

Singeing Machinery.
Butterworth & Sons Co., H. W.
Phila. Drying Machine Co.
Textile Finishing Machinery Co., The

Size Box Temperature Controller.
Powers Regulator Co.
Taylor Instrument Co.
Tagliabue Mfg. Co., C. J.

Size Kettles.
Butterworth, H. W. & Sons C.
Howard & Bullough, Americ. Machine Co.
Lombard Iron Works & Sup. Co.
Saco-Lowell Shops.
Textile Finishing Machinery Co. The

Sizing and Finishing Compounds.
(See Finishing & Sizing Materials.)

Skewers.
Brown Co., David
Greenville Spool & Mfg. Co.
Jordan Mfg. Co.

Skylights—Steel.
Detroit Steel Products Co.
Lupton's Sons, Co., David

Slag.
Birmingham Slag Co.

Slashers and Slasher Room Supplies.
Butterworth & Sons Co., H. W.
Cocker Mch. & Foundry Co.
Howard & Bullough.
Lovingood Co.
Mossberg Co., Frank
Regnas & Co., J. R.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The

Slasher Tape.
(See Tape—Slasher.)

Slate Asphalt Roofing.
Barrett Co.

Sliding Partition Hardware.
Richards-Wilcox Mfg. Co.

Slubbers.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

Soap—Textile.
Althouse Chemical Co.
Aniline Dyes & Chemicals, Inc.
Arnold, Hoffman &Co.
Borne, Scrymser Co.
Dobbins Soap Mfg. Co.
Dow Chemical Co.
Du Pont de Nemours & Co., E. I.
Electric Smelting & Alum. Co.
Grasselli Chemical Co.
Kali Mfg. Co.
Hemingway & Co., Frank
Klipstein & Co., A.
Newport Chemical Works.
United Chemical Products Corp.
Warren Soap & Mfg. Co.
Wolf & Co., Jacques
World Mfg. Co.

Softeners—Cotton.
Althouse Chemical Co.
Aniline Dyes & Chemicals, Inc.
Arabol Mfg. Co.
Arnold, Hoffman & Co.
Atlantic Dyestuff Co.
Borne, Schrymser Co.
Bosson & Lane.
Dow Chemical Co.
Durex Chemical Co.
Du Pont de Nemours & Co., E. I.
Grasselli Chemical Co.
Hemingway & Co., Frank
Kali Mfg. Co.
Klipstein & Co., A.
Moore Oil Refining Co.
Newport Chemical Works.
National Oil Products Co.
Roessler & Hasslacher Chemical Co.
United Chemical Products Corp.
Wolf & Co., Jacques
World Mfg. Co.

Softeners—Water.
(See Water Softeners.)

Solderless Connectors (Franked.)
Westinghouse Elec. & Mfg. Co.

Solvents.
(See Finishing.)

Spindles.
Allen Spindle Corp.
Draper Corporation.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Whitin Machine Works.

Spindles—Ball Bearing.
Allen Spindle Corp.

Spinners.
Arlington Cotton Mills.
Arrow Mills, Inc.
Flint Mfg. Co.
Gray Mfg. Co.
Hunter Mg. & Comm. Co.
King Cotton Mills Corp.
Myrtle Mills, Inc.
Parkdale Mills, Inc.

Spinning Frames.
American Machine Co., H. & B.
Crompton & Knowles Loom Wks.
Fletcher Works.
Florsheim, H. A.
Howard & Bullough.
Schaum & Uhlinger.
Saco-Lowell Shops.
Whitin Machine Works.

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Spinning Rings.
Allen Spindle Corp.
Draper Corporation.
Howard & Bullough.
Greenville Spool & Mfg. Co.
Southern Novelty Co.
Whitin Machine Wks.
Whitinsville Spinning Ring Co.

Spinning Tape Specialists.
American Textile Banding Co. Inc.
Barber Mfg. Co.

Spooling Machinery.
Draper Corporation.
Greenville Spool & Mfg. Co.
Saco-Lowell Shops.
Smith & Furbush Machine Co.
Whitin Machine Works.

Spools & Skewers.
Brown Co., David
Greenville Spool & Mfg. Co.

Sprinkler Tanks.
(See Tanks, Towers, Etc.)

Sprockets.
Link-Belt Company.
Morse Chain Co.
Valley Iron Works.

Stamping (Dye Transfer System).
Kaumagraph Co.

Stamps, Stencils and Stencil Machines.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.
Lovingood Co.
Regnas & Co., J. R.
Southern Stamp & Stencil Co.

Stand Pipes.
(See Tanks, Towers, Etc.)

Starch & Gums.
(See Finishing and Sizing Materials.)

Steam Engines.
(See Engines—Steam.)

Steam Hose.
(See Hose—Steam.)

Steam Pumps.
(See Pumps—Steam.)

Steam Traps.
(See Traps—Steam.)

Steel Doors, Window, Partition, Etc.
Detroit Steel Products Co.
Lupton's Sons Co., David

Steel Lockers.
(See Lockers.)

Stencils & Stencil Papers.
(See Stamps and Stencils.)

Stencil Brushes.
(See Marking Pots and Brushes.)

Stencil Cutting Machines.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.
Lovingood Co.
Regnas & Co., J. R.
Southern Stamp &Stencil Wks.

Stop Motion.
Crompton & Knowles Loom Wks.
Draper Corporation.
Wildman Mfg. Co.

Storage Batteries.
Edison Storage Battery Co.

Storage Racks
(See Shelving)

Storage Tanks for Oil and Gasoline
Wayne Oil Tank & Pump Co.

Strapping.
(See Leather Specialties or Box Strapping.)

Supplies (General Mill).
Crymes Mchry. & Supply Co.
Fulton Supply Co.
Hulme, J. S.
Jones Mchry. Corp.
Mill Supply Co. of Greenville.
Regnas & Co., J. R.
Seeger Machine Tool Co.
Steel Heddle Mfg. Co.
Walraven Co., The

Switches (Knife-Elec.).
Crouse-Hinds Co.

Switchboards (Panel).
Crouse-Hinds Co.

Tables, Chairs, Etc.
Hill-Standard Co.
Reischmann Co.
Wright Co.

Tachometers.
Tagliabue Mfg. Co.
Veeder Mfg. Co.

Tag Addressing Machines.
Regnas & Co., J. R.

Tallow.
(See Finishing Materials.)

Tanks and Tubs.
Hightower Box & Tank Co.
Lombard Iron Works & Supply Co.
Permutit Co.
Phila. Drying Machinery Co.
Textile Finishing Machinery Co., The
Walsh & Weidner Boiler Co.

Tapes and Braids.
American Textile Banding Co., Inc.
Barber Mfg. Co.
Weimar Brothers.

Tape Looms—Cotton.
Fletcher Works.
Schaum & Uhlinger.

Tape—Slasher.
Lovingood Co.
Regnas & Co., J. R.

Tape Making Machines.
(See Bandage and Tape Mach.)

Telephones (Calling System.)
Carter Elec. Co.
Dixie Elec. Equip. Co.

Temperature Controllers.
Carrier Eng. Corp.
Parks-Cramer Co.
Powers Regulator Co.
Sturtevant Co., B. F.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Temples.
Draper Corporation.

Tenting Machines.
Collins, J. D.
General Utilities Co.
Lovingood Co.
Regnas & Co., J. R.

Tenters.
Butterworth & Sons Co., The
Textile Finishing Mach. Co.

Textile Machinery.
(See Cotton Mill Machinery.)

Theatre Equipment.
Lucas Theatre Supply Co.
Rothacker Film Mfg. Co.
Southern Theatre Equip. Co.

Thermometers—All Kinds.
Tagliabue Mfg. Co., C. J.
Taylor Instrument Co.

Thin Place Preventers.
Draper Corporation.

Thread Guides.
Mitchell-Bissell Co.
Palmer Co., The I. E.

Ties (Baling).
(See Bale Ties.)

Time Clocks.
International Time Recorder Co.

Tires—Auto and Truck.
Goodyear Tire & Rubber Co.
U. S. Rubber Co.

Toilets.
Crane Co.
Dail Steel Products Co.
Kaustine Co.
Rundle-Spence Mfg. Co.
Vogel Co., Jos. A.

Tools (All Kinds.)
Crymes Mchry. & Supply Co.
Fulton Supply Co.
Jones Mchry. Corp.
Pasco Tool Co.
Seeger Machine Tool Co.
Walraven Co., The

Towers.
(See Tanks and Towers.)

Tractors—Electric, Industrial.
Baker R. & L. Co.
Collins, J. D.
Elwell Parker Elec. Co.
Regnas & Co., J. R.

Transmission—Power.
(See Power Transmission Machinery.)

Transfer Points.
Adams Co., Geo. H.

Traps—Return Steam.
American Blower Co.
Morehead Mfg. Co.

Trucks—Auto.
Baker, R. & L. Co.
Corbitt Motor Truck Co.
Packard Motor Car Co.
Triangle Motor Truck Co.
White Co., The
White Hickory Motor Corp.

Trucks, Canvas.
Lane & Bro., W. T.

Trucks—Electric—Inter
Baker, R. & L. Co.
Collins, J. D.
Elwell-Parker Electric Co.
Regnas & Co., J. R.

Trucks—Elevating—Inter.
Collins, J. D.
Elwell-Parker Elec. Co.
Hulme, J. S.
Lovingood Co.
McKinney Mfg. Co.
Regnas & Co., J. R.

Trucks—Fibre—Inter. Etc.
Diamond State Fibre Co.
Keystone Fibre Co.
Rogers Fibre Co.
Standard Fibre Co.

Tubes (Cloth).
Diamond State Fibre Co.

Turbines—Steam.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Twisting Machinery.
Allen Spindle Corp.
Draper Corporation.
Howard & Bullough.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Whitin Machine Works.

Tying Machine (Package, etc.).
Bunn & Co., B. H.

Urinals.
Crane Co.
Dail Steel Products Co.
Rundle-Spence Mfg. Co.
Vogel Co., Jos. A.

Unions—Bronze.
Crane Co.
Jenkins Bros.
Lunkenheimer Co.

Vacuum Pans.
Cresson-Morris Co.

Valves—Angle, Globe and Cross.
Crane Co.
Jenkins Bros.
Lunkenheimer Co.

Valves—Blow-Off.
Crane Co.
Jenkins Bros.
Lunkenheimer Co.

Valves—Check.
Crane Co.
Jenkins Bros.
Lunkenheimer Co.

Valves—Gate.
Crane Co.
Jenkins Bros.
Lunkenheimer Co.

Valves—Non-return Stop.
Crane Co.
Jenkins Bros.
Lunkenheimer Co.

Valves—Pop-Safety.
Jenkins Bros.
Lunkenheimer Co.

Valve Discs.
Goodyear Tire & Rubber Co.
Graton & Knight Mfg. Co.
Jenkins Bros.

Varnishes.
Barrett Co.
Cooledge & Sons, F. J.
Du Pont de Nemours & Co., E. I.
Hampden Paint & Chem. Co.
Hurst Co.
Johnson Paint Co.
Peaslee Gaulbert Co., Inc.
Tropical Paint Co.
Wadsworth, Howland & Co., Inc.

Ventilating Apparatus.
American Blower Co.
Carlyle & Gale Co.
Carrier Eng. Corp.
General Electric Co.
New York Blower Co.
Parks Cramer Co.
Perkins & Son, Inc., B. F.
Sargent's Sons Co., C. G.
Sturtevant Co., B. F
Tolhurst Mch. Co.

Vises and Benches.
Richards-Wilcox Mfg. Co.

Village Architects and Designers.
Aladdin Co., The
Draper, E. S.
Lockwood Greene & Co.
Sirrine, J. E.
Tuxbury Lumber Co., A. C.

Village Houses.
Aladdin Co., The
Tuxbury Lumber Co., A. C.

Wagon and Car Unloaders.
Portable Machinery Co.

Warehouse Door Hardware.
Richards-Wilcox Mfg. Co.

Warp Drawing Machines.
Cocker Machine & Fdy. Co.
Crompton & Knowles Loom Wks.

Warpers and Warping Machinery.
Cocker Mch. & Fdry. Co.
Draper Corporation.
Howard & Bullough.
Mossberg Co., Frank
Saco Lowell Shops.
Smith & Furbush Mach. Co.

Washers—Cloth.
American Laundry Machinery Co.
Butterworth, H. W. & Sons Co.
Cocker Mch. & Foundry Co.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Textile Finishing Mchry. Co.

Washers.
Diamond State Fibre Co.
Graton & Knight Mfg. Co.

Washers—Rubber.
Goodyear Tire & Rubber Co.

Waste Dealers.
International Cotton Products Co.
Valley Waste Mills.

Waste Balers.
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Waste Machinery—Cotton.
Howard & Bullough.
Saco Lowell Shops.
Sargent's Sons Corp., C. G.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Whitin Machine Co.

Watchman Clocks.
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Water Coolers (Fountain).
Central Brass Mfg. Co.
Crane Co.
Rundle Spence Mfg. Co.
Southern States Supply Co.

Water Columns.
Lunkenheimer Co.

Water Softeners.
Permutit Co.
Refinite Co.
Scaife & Sons Co., Wm. B.

Water Towers.
(See Tanks and Towers.)

Waterproofing Machinery.
Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co. The

Weaving.
(See Yarn Manufacturers.)

Welding Apparatus—Electric Arc.
Westinghouse Elec. & Mfg. Co.

Welding Apparatus and Supplies—Oxy-Acetylene.
Commercial Acetylene Supply Co.
Linde Air Products Co.
Oxweld Acetylene Co.
Prest-O-Lite Co.
Southern Welding Co.
Standard Gas Products Co.
Waterhouse Welding Co.

Welding—Job.
Chattanooga Brazing & Welding
Southern Welding Co.
Southern Welding & Mch. Co.
Standard Gas Products Co,
Waterhouse Welding Co.

Welfare Architects.
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Welfare Equipment.
Hill-Standard Co.
Industrial Welfare Builders.
Lucas Theatre Supply Co.
Medart Mfg. Co., Fred.
Reischmann Co.
Rothacker Film Co.
Southern Theatre Equip. Co.
Thomas Co., F. H.
Wright Co.

Wheels—Fibre.
Diamond State Fibre Co.
Keystone Fibre Co.
Rogers Fibre Co.
Standard Fibre Co.

Wheel Puller.
Greb Co., Inc.

Whistles—Steam.
Crane Co
Lunkenheimer Co.

Winders.
Firsching, J. A.
Howard & Bullough, American Machine Co.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Stafford Co., The
Universal Winding Co.

Windows—Steel.
Detroit Steel Products Co.
Lupton's Sons Co., David

Wires (Drop).
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Wiring—Electrical.
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Wood.
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Wood Preserver.
Atlanta Gas Light Co.
Barrett Co.
Du Pont de Nemours & Co., E. I.
Gulf States Creosoting Co.
Hurst Co.
Johnson Paint Co.
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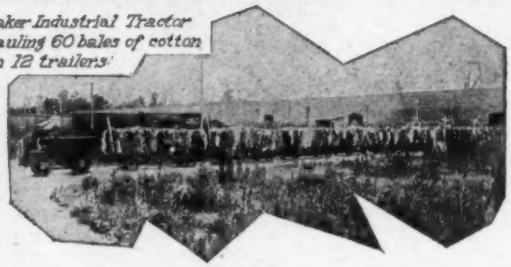

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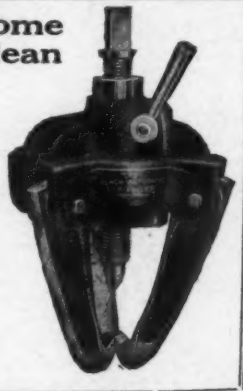

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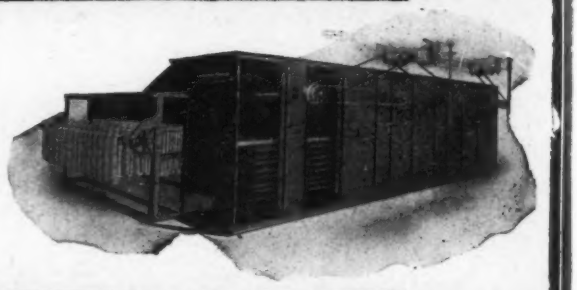

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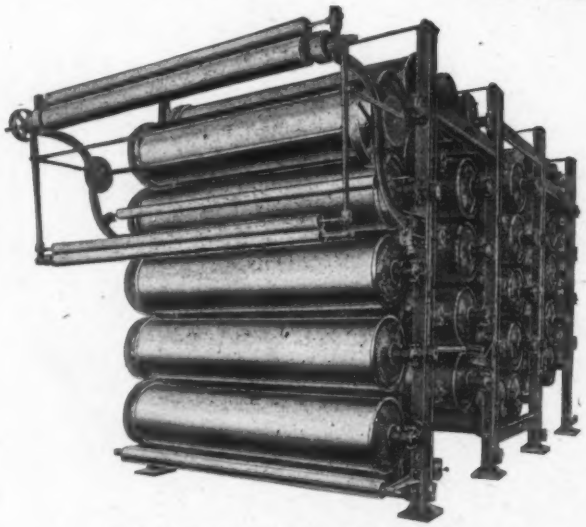

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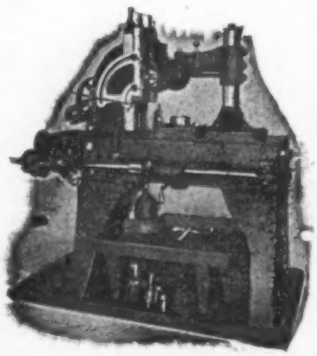

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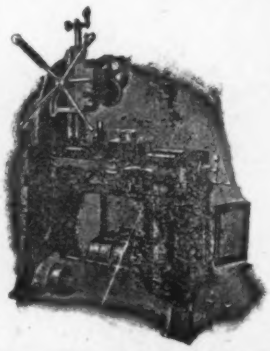

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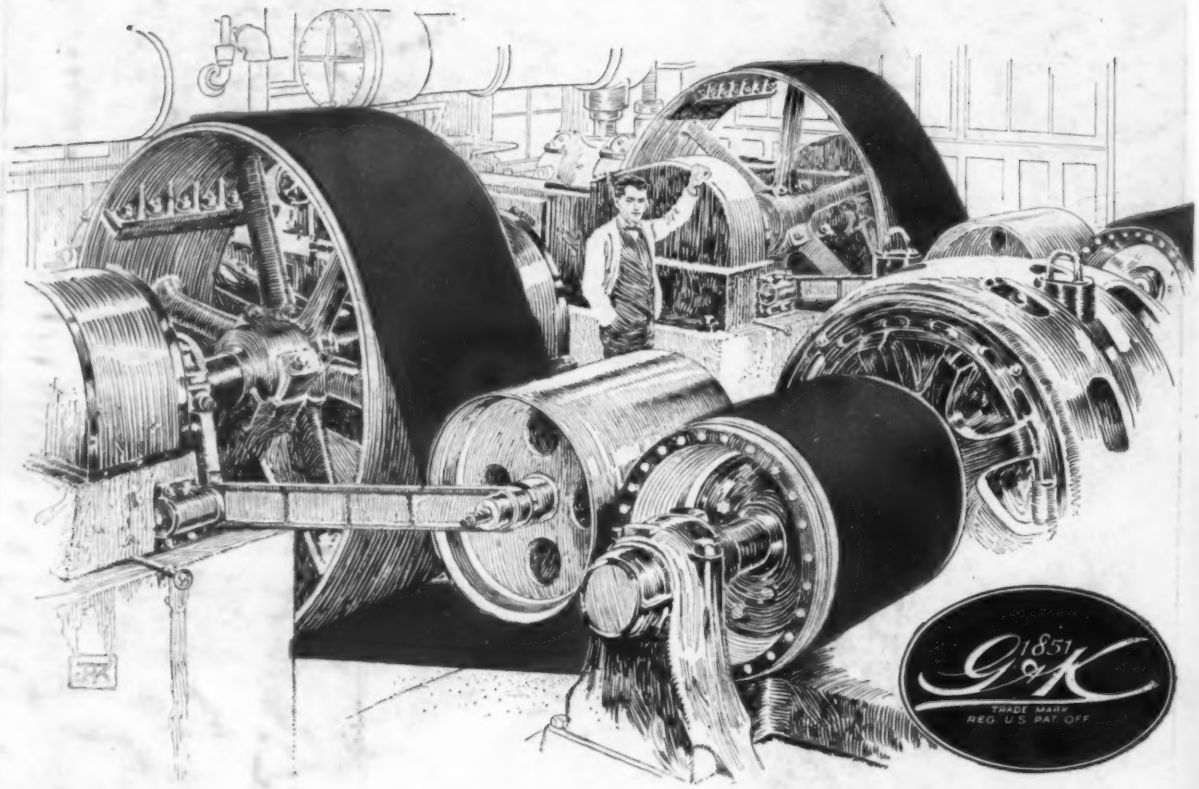

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